

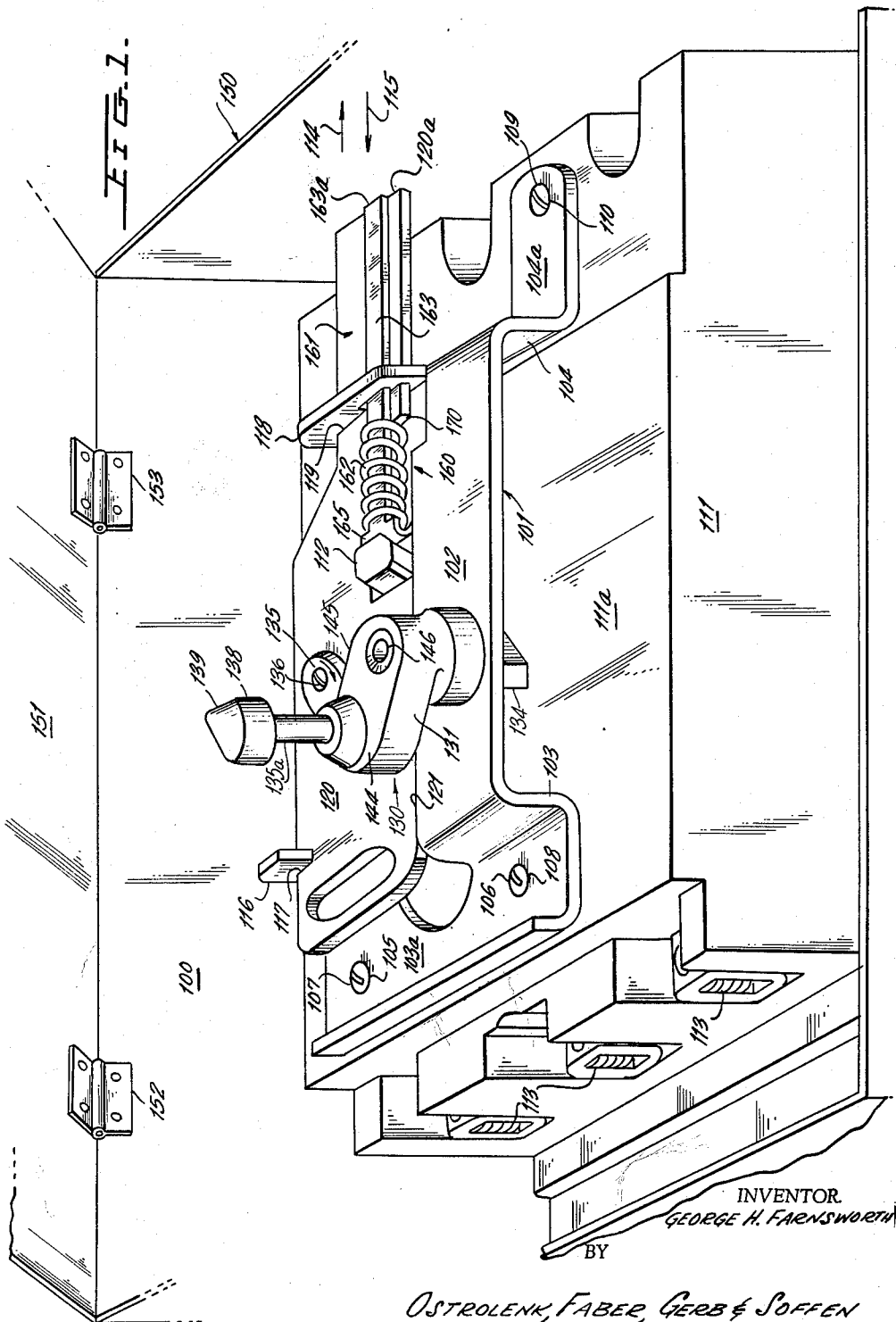
April 27, 1965

Filed Oct. 19, 1962

5 **G. H. FARNSWORTH**
ROTARY MOTION TRANSLATING MEANS FOR USE WITH
LINEARLY MOVING HANDLES
962

3,180,964

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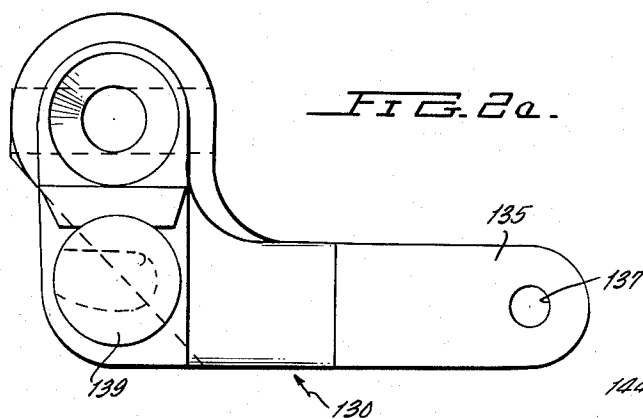


FIG. 2a.

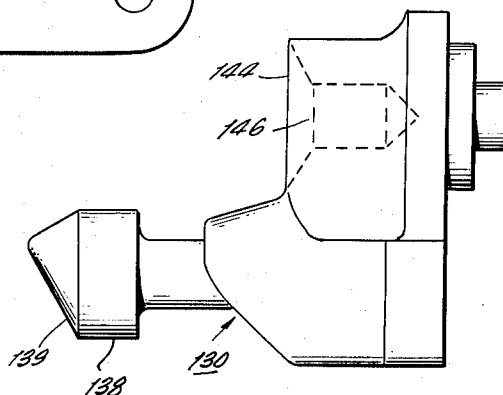


FIG. 2c.

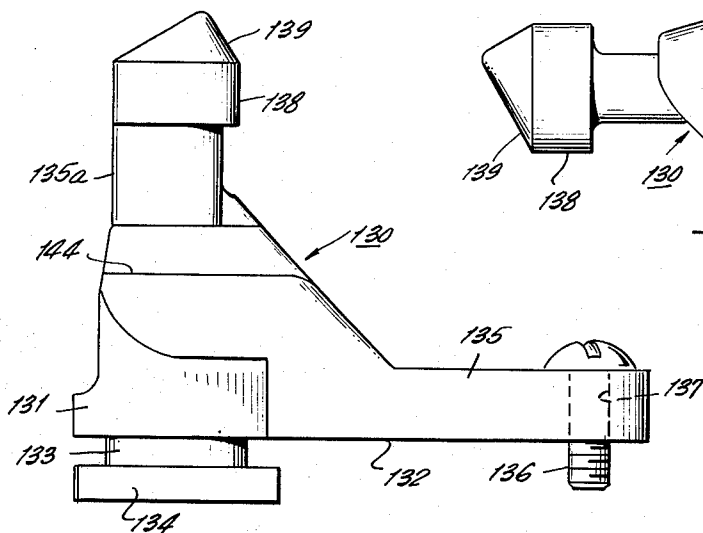


FIG. 2b.

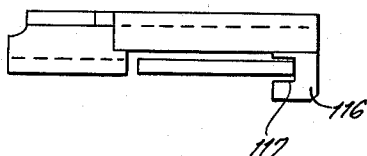


FIG. 3c.

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3 Sheets-Sheet 3

FIG. 3a.

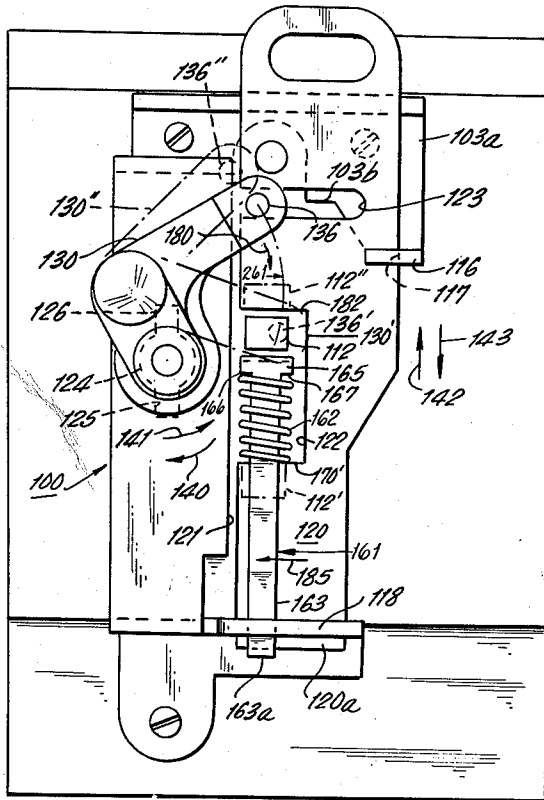
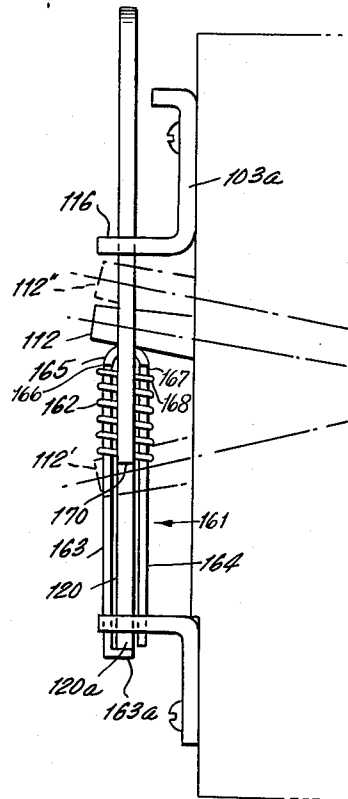


FIG. 3b.



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ROTARY MOTION TRANSLATING MEANS FOR USE WITH LINEARLY MOVING HANDLES

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7 Claims. (Cl. 200—172)

This invention relates to motion translating means and more particularly to a device for translating rotary motion to linear motion and is especially adaptable for use in circuit breaker assemblies where it is desired to employ an exteriorly mounted rotary operating handle for operating the switch of an interior mounted circuit breaker assembly.

In many circuit breaker applications it is desirable to mount the circuit breakers within cubicles or other suitable enclosures so that the circuit breaker and its associated source and load conductors with which it is connected are completely enclosed, thereby protecting operators, maintenance men and others from the live circuits contained within the enclosure. It is quite frequently necessary, however, to manually operate the circuit breaker to the open position for inspection, maintenance, and other purposes and also to reset and close the circuit breaker which has tripped automatically, after the fault condition has been cleared and the circuit is placed in readiness for normal routine operation. Such manual manipulation of the circuit breaker does not require the opening of the cubicle or enclosure and for this reason it is therefore desirable to provide an exteriorly mounted operating handle, enabling manual manipulation of the interiorly mounted circuit breaker without opening the enclosure door. The prior art provides such motion translating devices for coupling the rotary motion of an exteriorly mounted rotary operating handle to the circuit breaker handle of an interiorly mounted circuit breaker, one typical assembly being set forth in U.S. Patent No. 2,741,684 entitled Operating Handle Adapter issued April 10, 1956, to J. C. Brumfield and assigned to the assignee of the instant invention. Since circuit breakers operated by motion translation devices of this general type are subjected to repeated usage, it is important to provide translational apparatus adapted for preservation of the circuit breaker elements which are operated under control of the translation apparatus. None of the prior art devices have such an advantageous arrangement.

The device of the instant invention, in addition to providing resilient cushioning means for the protection of the circuit breaker operating handle, further provides a novel operating lever which is operatively connected to the remainder of the translational apparatus without necessity for providing additional fastening members and which is further provided with two separate means engageable with the operating handle to provide leverage sufficient to readily operate the exteriorly mounted operating arm with a minimum operating force being required.

The translational apparatus of the instant invention is comprised of a mounting plate adapted for receiving and guiding a reciprocally mounted operating plate. The

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mounting plate is adapted to be rigidly secured to any standard circuit breaker assembly such as, for example, a molded case type circuit breaker assembly which is provided with a manual operating handle. The operating plate is provided with a suitable opening for receiving the projecting handle of the circuit breaker. The operating lever member is a substantially L-shaped member which is pivotally mounted at the end of one arm of the L-shaped configuration by suitable pivoting means which is secured to the stationary mounting plate. A projection is provided on the operating lever at the knee of the L-shaped configuration, which projection is provided with a tapered portion for engagement with exteriorly mounted operating handle of any standard type having the capability of being rotatably mounted for imparting rotation of movement to the translational motion device operating lever. The remaining arm of the L-shaped member is provided with a projecting pin which cooperates with an elongated slot provided in the reciprocally mounted operating plate, so as to impart movement to the operating plate upon rotation of the rotary mounted operating lever. The operating lever is further provided with a tapered opening which opening is substantially concentric with the operating lever pivoting point and which opening is adapted for receiving a projecting pivot pin extending from the rotary mounted exterior operating handle. The operating lever is provided with a key shaped projection cooperative with an opening of substantially the same configuration in the mounting plate so as to operatively link the operating lever to the mounting plate without the necessity for additional fastening means.

The mounting plate is so formed as to provide suitable slots for guiding the reciprocally mounted operating plate, thereby confining the operating plate so that it will experience only linear motion. A shock absorbing arrangement is provided for absorbing any excessive forces exerted upon the circuit breaker operating handle by the operating plate in order to prevent breakage or like damage to the circuit breaker handle. The cushioning mechanism is comprised of a bumper arrangement which is slidably engaged by the plate so that the bumper surface abuts one side of the circuit breaker operating handle. Biasing means are positioned between the bumper surface and the operating plate causing the bumper to be biased in the direction towards the circuit breaker operating handle. The arrangement is such that in the opening operation, if a greater force than is necessary to open the breaker is exerted upon the translational assembly operating lever, any excess forces which might be imparted to the circuit breaker operating handle are absorbed by the shock absorbing means so that no severe strain is imposed upon the circuit breaker handle. The shock absorbing means is adapted, however, to impart substantially all the force exerted upon it by the operating plate to the circuit breaker operating handle, except for the occasion when the rotary operating handle, which is manipulated to move the circuit breaker to the off position, it is moved to a point beyond which it is necessary for a normal circuit breaker closure operation. The biasing member for the shock absorber assembly further acts to maintain the motion translation apparatus as a unified assembly by preventing either wilful or accidental dismantling of the assembly,

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thereby providing a motion translation assembly requiring no separate fastening means whatsoever.

It is therefore one object of this invention to provide a motion translation apparatus having a novel arrangement for imparting linear motion to a circuit breaker handle under control of a rotary operating handle.

Another object of this invention is to provide a motion translation assembly for translating rotary motion to linear motion which is so designed as to provide a unique operating lever assembly to substantially reduce the driving forces required by the motion translation assembly.

Another object of this invention is to provide a motion translation assembly for converting rotary motion to linear motion for driving a circuit breaker manual operating handle which is so designed as to provide a novel shock absorbing assembly, thereby avoiding breakage of the circuit breaker manual operating handle.

Still another object of this invention is to provide a motion translation assembly for use with circuit breaker operating handles and the like, whose elements are so designed as to cooperate in a unique manner, thereby removing the need for providing any additional faceting means whatsoever.

Still another object of this invention is to provide a motion translation apparatus for circuit breaker operating handles and the like, having a unique operating lever arrangement which is so adapted as to engage an input rotary operated handle at two separate points of engagement, thereby substantially reducing the drive forces needed for operating the motion translation assembly.

These and other objects will become apparent when reading the accompanying description and drawings in which:

FIGURE 1 is a perspective view of the motion translation assembly designed according to the principles of the instant invention which assembly is shown in its environment with a circuit breaker assembly.

FIGURES 2a, 2b and 2c are top, side and end plan views of the operating lever which forms part of the motion translation assembly shown in FIGURE 1.

FIGURES 3a, 3b and 3c are top, side and end plan views respectively, of the motion translation device of FIGURE 1.

Referring now to the drawings and most particularly to FIGURE 1, the motion translation device 100 of the instant invention is comprised of a stationary mounting plate 101, having a substantially flat central portion 102 having arms 103 and 104 extending downwardly from the central portion 102. Arms 103 and 104 are bent away from one another to form flanges 103a and 104a respectively. Flange 103a is provided with suitable apertures 105 and 106 for receiving fastening members 107 and 108, respectively, while flange 104a is provided with an aperture 109 for receiving fastening member 110.

As shown in FIGURE 1, mounting plate 102 is secured by fastening means 108, 107 and 110 to a circuit breaker 111 of the molded casing type, which circuit breaker is provided with a manually operable handle member 112 projecting upward from a position substantially above the breaker top surface 111a. Molded case breaker 111, as shown in FIGURE 1 is a three pole circuit breaker having load terminals, such as, for example, the three load terminals 113 which are positioned at the left and right hand ends respectively, of the breaker 111 for receiving and securing source and load conductors of the circuit to be protected to the circuit breaker 111.

It is not necessary for purposes of understanding the instant invention that the circuit breaker 111 be described in great detail. It need only be understood that the circuit breaker 111 is provided with a manually operable handle 112 which experiences substantially linear motion relative to the top surface 111a of breaker 111, which linear motion occurs in the directions shown by arrows 114 and 115 shown in FIGURE 1. It should further be understood that the motion translation assembly 100 of

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the instant invention may be used advantageously with circuit breakers of greater or lesser poles and of various designs which depart substantially from the circuit breaker shown in FIGURE 1, the only requirement being that the circuit breaker to be operated by the motion translation assembly 100 be provided with an operating handle which experiences substantially linear motion similar to that experienced by the circuit breaker 111 shown in FIGURE 1 herein.

The stationary mounting plate 102 is further provided with upwardly extending projections 116 and 118 for receiving the motion translation assembly operating plate 120 in a manner to be more fully described. The projection 116 is provided with a notched portion 117 while the projection 118 is provided with an irregularly shaped elongated slot 119, such that the notch 117 and slot 119 cooperate together with the substantially straight edge 121 of stationary plate 102 so as to guide operating plate 120 and position it relative to stationary mounting plate 102, in order to limit movement of the operating plate 120 to the linear direction shown by arrows 114 and 115, of FIGURE 1. Operating plate 120 is provided with a substantially rectangularly shaped notch 122 for receipt of the breaker operating handle 112 and the motion translation shock absorbing assembly, to be more fully described. Operating plate 120 is further provided with an elongated slot 123 (see FIGURE 3a) for receipt of the operating lever drive pin, in order to impart the linear motion to the operating plate 120 in a manner to be more fully described.

Motion translation assembly 100 is further provided with an operating lever 130 which lever 130 is substantially L-shaped, the under side 132 of the lever arm 131 is provided with a substantially circular shaped projection 133, having its upper end integral with the under side 132 of lever 130, and having its lower end integral with a substantially elongated rectangular rib 134, which is integral with the lower end of the circular projection 133. Mounting plate 102 is provided with a substantially circular opening 124 (see FIGURE 3a) having oppositely directly notched portions 125 and 126 extending therefrom, opening 124 and notches 125 and 126 being shown by the phantom line of FIGURE 3a. These cooperating configurations 124-126 act so as to cause the circular projection 133 on operating lever 130 to act as the pivot means for operating lever 130 within the opening 124. The joining of the operating lever 130 and the mounting plate 102 is made by aligning operating lever 130 such that the elongated rib 134 (FIGURES 2a-2c) is positioned immediately above and substantially in alignment with the notches 125 and 126 of the mounting plate 102. In this position the operating lever 130 is then moved downward so that the elongated rib 134 passes through the opening in mounting plate 102 until the under side 132 of operating lever 130 rests against the upper surface of mounting plate 102.

The under side 132 of arm 135 of the operating lever 130 is provided with a pin 136 which is inserted through an aperture 137 provided in arm 135, which arrangement can best be seen in FIGURES 2a and 2b. Pin 136 acts as a driving pin for operating plate 120 and cooperates with operating plate 120, such that the downwardly projecting portion of driving pin 136 is adapted to be received by the elongated slot 123 provided in operating plate 120. This linkage is affected by sliding operating plate 120 in either the direction shown by arrow 114 or by arrow 115, FIGURE 1, such that the elongated slot 123 is immediately beneath the driving pin 136 at the moment that the projecting rib 134 is being inserted into the opening 124-126 of mounting plate 102. Thus as projecting rib 134 is inserted into the opening 124-126, the driving pin 136 is simultaneously therewith inserted into the elongated slot 123 of opening plate 120. With this arrangement, the operating lever 130 is then adapted to rotate in either the clockwise or counterclockwise directions,

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as shown by arrows 140 and 141 in FIGURE 3a while the operating plate 120 under control of rotation of operating lever 130 moves in the direction shown by arrows 142 and 143 respectively, as shown in 3a.

Operating lever 130 is further provided with a suitable extended shaft 135a having a head 138. The upper end of shaft 135a is provided with a head 138 having a tapered, or conical portion 139 for engagement with a suitable opening (not shown) in the rotary operating handle for rotating the operating lever 130 in a manner to be more fully described. The upper surface 144 of arm 145 is provided with an opening 146 which tapers inwardly and downwardly from surface 144 for receipt of a rotary handle projecting pin (not shown) in order to facilitate the rotational motion imparted to the operating lever 130 by means of the operating handle (not shown). The operating handle which may be employed with the motion translation assembly 100 of the instant invention is set forth in copending U.S. application 220,356 entitled Universal Unitary Handle For Switches, filed August 30, 1962, by F. W. Kussy et al., and assigned to the assignee of the instant invention. Since a detailed description of the operating handle set forth in the above mentioned copending application is not necessary for the understanding of the instant invention, the description of the operating handle set forth therein is incorporated herein by reference thereto. It is sufficient for purposes of understanding the instant invention to know that the operating handle set forth therein is provided with a suitable opening for receiving the head member 138 of operating lever 130 and is further provided with a projecting pin (about which the rotary handle pivots) which is insertable into the tapered opening 146 of operating lever 130. The purpose of the tapered portion 139 of head 138 and the tapered aperture 146 in arm 145 is to facilitate the engagement of the operating lever 130 by the exteriorly mounted operating handle (not shown).

A typical environment for the motion translation assembly as shown in FIGURE 1 is a suitable enclosure or cubicle 150, a major portion of which has been broken away in order to view the assembly 100 and which is further provided with a door 151 which is hinged to open by hinge assemblies 152 and 153. The operating handle (not shown) is appropriately mounted to the cover member 151 in a position so as to be substantially in alignment with the operating lever 130 such that the operating lever 130 and the rotary operating handle (not shown) are readily and simply brought into engagement upon closure of cover 151 which engagement is greatly facilitated by the tapered portion 139 of head 138 and the tapered opening 146 of arm 145. It should be noted that the motion translation assembly 100 of FIGURE 1 is not limited to use in a cubicle of predetermined depth but may be employed in cubicles of varying depths simply by providing suitable extensions from the ends of arms 135 and 145 wherein such extensions project downwardly away from the arm portions of operating lever 130, so as to enable cooperation between the driving pin 136, and elongated slot 123, and between the elongated rib 134 and opening 124-125 of mounting plate 102. The advantages of connecting the operating lever 130 to the operating handle assembly (not shown) at two separate points, namely, at the tapered head 138 and tapered opening 146, substantially diminishes the forces needed, and which are applied to the handle (not shown) of the operating handle assembly in order to impart rotation to the operating lever 130. The advantages and the detailed description of the co-operating relationships between the operating lever 130 and the rotary handle assembly (not shown) is set forth in great detail in the aforementioned co-pending application, entitled "Universal Unitary Handle For Switches."

The motion translation assembly 100 is further provided with a shock absorbing assembly 160, comprising

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a bumper member 161 and a biased member 162. The bumper 161 is provided with upper and lower elongated portions 163 and 164, (note especially FIGURES 1 and 3b), which portions 163 and 164 substantially form the arms of a substantially U-shaped bumper member 161, having a yoke portion 165 provided with shoulders 166 and 167 which abut the end 168 of biasing member or spring 162. The other end of biasing member 162 abuts the edge 170 of operating plate 120. Biasing member or spring 162 is thereby adapted to urge the bumper member 161 in the direction shown by arrow 115, relative to the operating plate 120. Movement of bumper 161 in the direction shown by arrow 115 is limited by means of the flange 163a provided at the end of arm 163 which abuts the edge 120a of operating plate 120 to prevent further movement of bumper 163 in a direction shown by arrow 115, relative to the operating plate 120.

The operation of the motion translation assembly 100 is as follows:

FIGURE 3a shows the motion translation assembly 100 and the circuit breaker handle member 112, such that the positions occupied by these elements denote the fact that the circuit breaker handle is in the off position which means that the cooperating contacts (not shown) of circuit breaker 111 are the disengaged condition. Assuming that the circuit breaker has been manually moved to the off position, the operating lever 130 must then be rotated clockwise direction as shown by arrow 140 in order to move the circuit breaker to the "On" position. When the operating lever 130 is rotated in the direction shown by arrow 140, this causes the drive pin 136 to move along an arc shown by dash line 261 in the direction shown by arrow 143. Drive pin 136 abuts against the lower edge of elongated slot 123, causing operating plate 120 to move in a direction shown by arrow 143. Thus operating plate 120 moves in the direction shown by arrow 143. The edge 182 of notch 122 in operating plate 120 abuts circuit breaker handle 112 causing the handle of 112 to move in the direction shown by arrow 143. This movement continues until circuit breaker handle 112 moves to the "On" position, shown by the dashed line configuration 112' in FIGURE 3a. With the circuit breaker operating handle 112' in the "On" position, the operating lever and operating pin have moved to the position shown by dashed lines 130' and 136', as shown in FIGURE 3a.

Assuming that the circuit breaker has moved to the "Off" position due to the operation of an automatic tripping means (not shown) contained within the circuit breaker assembly, it is necessary first that the circuit breaker handle 112 be moved to the reset position in order to reset the latch which cooperates with the automatic trip assembly of the circuit (not shown). This is effected by rotating operating lever 130 in the direction shown by arrow 141 so that the operating pin and the operating lever move to the position shown by the dash lines 136'' and 130'' respectively. This causes the circuit breaker operating handle 112 to move to the position shown by the dash lines 112'' for producing the reset operation for the automatic trip means of the circuit breaker mechanism (not shown). The circuit breaker operating handle 112 may then be moved to the "On" position as shown by dash lines 112' in the same manner as was previously described.

In order to provide a manual opening operation, that is, in order to move the circuit breaker from the position shown by dash lines 112' to the position shown by solid line 112, the operating lever is moved from the position shown by dash lines 130' to the solid line position shown by numeral 130. This occurs in the exact manner as was previously described above, except that the operating lever 130 rotates in the opposite, or counter-clockwise direction, as shown by arrow 141 of FIGURE 3a.

In operating the lever 130 in the direction shown by

arrow 141, it is possible that, either accidentally or deliberately, the operating lever 130 may be rotated in the counterclockwise direction beyond the position shown by the dash lines 130". If this occurs, it imposes a severe strain upon the circuit operating handle 112 and also upon the instantaneous trip mechanism latch assembly (not shown) which may ultimately cause breakage of either or both of these elements. Since it is not always possible to accurately terminate rotation of the operating lever 130 at the exact position shown by the dash lines 130", the motion translation device 100 has been provided with the shock absorber assembly 160 which operates in the following manner:

When the operating lever 130 has moved to the position shown by dash lines 130", circuit breaker handle 112 is unable to move any further in the direction shown by arrow 142, of FIGURE 3a. The yoke portion 65 of the bumper assembly 160 thereby is enabled to absorb this additional rotational force imparted to operating lever 130 in such a manner that the biasing spring 162 yields or compresses an amount sufficient to absorb the extra rotating force imparted to operating lever 130. Thus the bumper member 161 moves in the direction shown by arrow 143 relative to the operating plate 120, thereby substantially reducing the forces imparted to the breaker operating handle 112, so as to prevent any undue strain upon the circuit breaker handle 112. It should be understood, however, that the spring constant of biasing spring 162 has a magnitude which is adapted to cause spring 162 to undergo substantially no compression or contraction at a time in which circuit breaker 112 is moved from "On" position, shown by dash lines 112' to the "Off" position, as shown by dash lines 112", so that substantially all the rotational processes imparted to operating lever 130 are imparted to the operating plate 120, which undergoes substantially linear motion. However, once the circuit breaker handle occupies the position shown by dash lines 112", biasing spring 162 in this position is sufficiently yieldable to absorb any rotational forces imparted to operating lever 130, such that operating plate 120 will move as shown by arrow 143, while bumper member 161 remains stationary, the spring 162 absorbs any additional rotational force. Operating plate 120 will move in a direction shown by arrow 142, causing bumper member 161 to move in a direction shown by arrow 143, so that operating handle 112 in a position shown by dash lines 112" will remain substantially stationary so as to prevent any break of the handle 112". Bumper member 161 remains stationary whenever handle 112 stops moving.

It should further be noted that the motion translation assembly 100 in any position between the reset and On positions may not be disassembled and remains intact (i.e., remains in its assembled state) without the necessity for any additional fastening means whatever. The motion translation assembly 100 may be readily disassembled, however, simply by removing the driving pin 136 from elongated slot 123, enabling the removal of operating plate 120 from the guiding projections 116 and 118. The operating plate 120 may be removed from the mounting plate 102 simply by rotating operating lever 130 to a position, whereby the projection 134 is in alignment with the opening 124-126 to the mounting plate 102, and then simply lifting operating lever 130 up and away from plate 102. Bumper member 161 may then be removed from operating plate 120, simply by sliding bumper member 161 in the direction shown by arrow 185 of FIGURE 3A away from operating plate 120 such that the entire motion translation apparatus may be readily assembled and disassembled, and as previously mentioned, remains in its fully assembled state without the necessity of providing any fastening means whatsoever, such that the stationary mounting plate 102, the operating member 130 and the shock absorber assembly 160 provide regular functions and in addition thereto provide the functions

of maintaining the motion translation assembly 100 in its fully assembled state once it has been assembled.

The flange 103a of stationary mounting plate 102 is provided with a notch 103b, which is so positioned as to permit the mounting of the motion translation assembly 100 to the circuit breaker 111 in the position shown in FIGURE 1 and so as to prevent mounting of the translation assembly 100 upon breaker 111, if the motion translation assembly is rotated 180° away from the position shown in FIGURE 1. This greatly facilitates mounting of the motion translation assembly to the circuit breaker.

It can therefore be seen that this invention provides a motion translation device for operation of an interior mounted circuit breaker and which requires less of a driving force than present day devices, which provides a novel shock absorbing assembly for preventing any harm to the circuit breaker manual handle and the circuit breaker latched mechanism and which is further designed to retain all of the operating elements in the assembled state without the necessity for additional fastening means.

In the foregoing, the invention has been described only in connection with preferred embodiments thereof. Many variations and modifications of the principles of the invention within the scope of the description herein are obvious. Accordingly, it is preferred to be bound not by the specific disclosure herein, but only by the appended claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. A motion translation assembly for circuit breaker manual operating handles and the like comprising stationary mounting means being adapted for securement to a circuit breaker casing; an operating plate mounted for reciprocal movement within guide means provided on said mounting means; an operating lever pivotally mounted to said mounting means and including a depending drive pin; said operating plate having first and second elongated slots being aligned transverse to one another; said drive pin being disposed within and slidably engaged by said first elongated slot; said second elongated slot being adapted to receive a circuit breaker manual operating handle; said operating lever having a tapered head member and a tapered aperture remote from said tapered head member for engagement with a driving member to rotate said operating lever; said operating plate being adapted to impart linear motion to a circuit breaker operating handle upon rotation of said operating lever.

2. A motion translation assembly for circuit breaker manual operating handles and the like comprising stationary mounting means being adapted for securement to a circuit breaker casing; an operating plate mounted for reciprocal movement within guide means provided on said mounting means; an operating lever pivotally mounted to said mounting means and including a depending drive pin; said operating plate having first and second elongated slots aligned transverse to one another; said drive pin being disposed within and slidably engaged by said first elongated slot; said second elongated slot being adapted to receive a circuit breaker manual operating handle; said operating lever having a tapered head member and a tapered aperture remote from said tapered head member for engagement with a driving member to rotate said operating lever; said operating plate being adapted to impart linear motion to a circuit breaker operating handle upon rotation of said operating lever; shock absorbing means slidably mounted to said operating plate for absorbing excessive operating forces imposed upon the operating lever to prevent damage to the circuit breaker handle.

3. A motion translation assembly for circuit breaker manual operating handles and the like comprising stationary mounting means being adapted for securement to a circuit breaker casing; an operating plate mounted

for reciprocal movement within guide means provided on said mounting means; an operating lever pivotally mounted to said mounting means and including a depending drive pin; said operating plate having first and second elongated slots being aligned transverse to one another; said drive pin being disposed within and slidably engaged by said first elongated slot; said second elongated slot being adapted to receive a circuit breaker manual operating handle; said operating lever having a tapered head member and a tapered aperture remote from said tapered head member for engagement with a driving member to rotate said operating lever; said operating plate being adapted to impart linear motion to a circuit breaker operating handle upon rotation of said operating lever; shock absorbing means slidably mounted to said operating plate for absorbing excessive operating forces imposed upon the operating lever to prevent damage to the circuit breaker handle; said shock absorbing means comprising a bumper element slidably mounted to said operating plate whereby a portion of said bumper element projects into said second elongated slot; biasing means urging said bumper element towards said second elongated slot.

4. A motion translation assembly for circuit breaker manual operating handles and the like comprising stationary mounting means being adapted for securement to a circuit breaker casing; an operating plate mounted for reciprocal movement within guide means provided on said mounting means; an operating lever pivotally mounted to said mounting means and including a depending drive pin; said operating plate having first and second elongated slots being aligned transverse to one another; said drive pin being disposed within and slidably engaged by said first elongated slot; said second elongated slot being adapted to receive a circuit breaker manual operating handle; said operating lever having a tapered head member and a tapered aperture remote from said tapered head member for engagement with a driving member to rotate said operating lever; said operating plate being adapted to impart linear motion to a circuit breaker operating handle upon rotation of said operating lever; shock absorbing means slidably mounted to said operating plate for absorbing excessive operating forces imposed upon the operating lever to prevent damage to the circuit breaker handle; said shock absorbing means comprising a bumper element slidably mounted to said operating plate whereby a portion of said bumper element projects into said second elongated slot; biasing means urging said bumper element towards said second elongated slot; said operating lever further comprising a projecting rib extending towards said mounting means; said mounting means having an opening shaped substantially the same as said projecting rib; said opening and said projecting rib cooperating to pivotally couple said operating lever to said mounting means when said rib and said opening are rotated relative to one another so that their configurations are not in alignment.

5. A motion translation assembly for circuit breaker manual operating handles and the like comprising stationary mounting means being adapted for securement to a circuit breaker casing; an operating plate mounted for reciprocal movement within guide means provided on said mounting means; an operating lever pivotally mounted to said mounting means and including a depending drive pin; said operating plate having first and second elongated slots being aligned transverse to one another; said drive pin being disposed within and slidably engaged by said first elongated slot; said second elongated slot being adapted to receive a circuit breaker manual operating handle; said operating lever having a tapered head member and a tapered aperture remote from said tapered head member for engagement with a drive member to rotate said operating lever; said operating plate being adapted to impart linear motion to a circuit breaker operating handle upon rotation of said operating lever; shock ab-

sorbing means slidably mounted to said operating plate for absorbing excessive operating forces imposed upon the operating lever to prevent damage to the circuit breaker handle; said shock absorbing means comprising a bumper element slidably mounted to said operating plate whereby a portion of said bumper element projects into said second elongated slot; biasing means urging said bumper element towards said second elongated slot; said operating lever further comprising a projecting rib extending towards said mounting means; said mounting means having an opening shaped substantially the same as said projecting rib; said opening and said projecting rib cooperating to pivotally couple said operating lever to said mounting means when said rib and said opening are rotated relative to one another so that their configurations are not in alignment; said mounting means comprising first and second slotted projections for slidably receiving said operating plate; said mounting means further having a first side adjacent said operating plate which cooperates with said operating plate to prevent movement of said operating lever in a first rotary direction to a position whereby the configurations of said projecting rib and said opening are in alignment.

6. A motion translation assembly for circuit breaker manual operating handles and the like comprising stationary mounting means being adapted for securement to a circuit breaker casing; an operating plate mounted for reciprocal movement within guide means provided on said mounting means; an operating lever pivotally mounted to said mounting means and including a depending drive pin; said operating plate having first and second elongated slots being aligned transverse to one another; said drive pin being disposed within and slidably engaged by said first elongated slot; said second elongated slot being adapted to receive a circuit breaker manual operating handle; said operating lever having a tapered head member and a tapered aperture remote from said tapered head member for engagement with a drive member to rotate said operating lever; said operating plate being adapted to impart linear motion to a circuit breaker operating handle upon rotation of said operating lever; shock absorbing means slidably mounted to said operating plate for absorbing excessive operating forces imposed upon the operating lever to prevent damage to the circuit breaker handle; said shock absorbing means comprising a bumper element slidably mounted to said operating plate whereby a portion of said bumper element projects into said second elongated slot; biasing means urging said bumper element towards said second elongated slot; said operating lever further comprising a projecting rib extending towards said mounting means; said mounting means having an opening shaped substantially the same as said projecting rib; said opening and said projecting rib cooperating to pivotally couple said operating lever to said mounting means when said rib and said opening are rotated relative to one another so that their configurations are not in alignment; said mounting means comprising first and second slotted projections for slidably receiving said operating plate; said mounting means further having a first side adjacent said operating plate which cooperates with said operating plate to prevent movement of said operating lever in a first rotary direction to a position whereby the configurations of said projecting rib and said opening are in alignment; said biasing spring being adapted to abut said one of said slotted projections to prevent movement of said operating lever in a second direction opposite said first direction to a position whereby the configurations of said projection and said opening are in alignment.

7. A motion translation assembly for circuit breaker manual operating handles and the like comprising stationary mounting means being adapted for securement to a circuit breaker casing; an operating plate mounted to said mounting means and guided for reciprocal movement in the plane of said plate; an operating lever mounted to said

mounting means and pivotable about an axis transverse to said plate; said operating lever including a drive pin extending parallel to said axis at a point remote therefrom; said operating plate having first and second slots therein; said first slot being elongated and having said drive pin slidably disposed therein; said first slot positioned with its longitudinal axis transverse to the line of movement of said plate; said second slot being adapted to receive a circuit breaker manual operating handle pivoted on an axis parallel to said longitudinal axis; said operating lever having a tapered head member and a tapered aperture remote from said tapered head for engagement with a driving member to rotate said operating lever; said operating plate being adapted to impart linear

motion to a circuit breaker operating handle upon rotation of said operating lever.

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