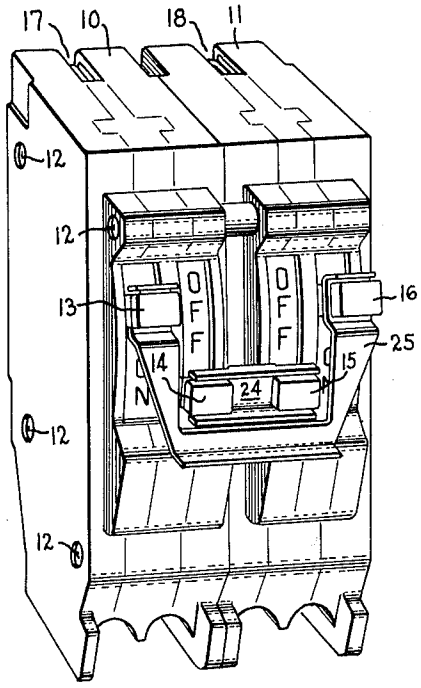
Nov. 24, 1964 H. A. NADEAU 3,158,701

MULTIPLE CIRCUIT BREAKER ASSEMBLY

Filed July 31, 1962 2 Sheets-Sheet 1

FIG. 1



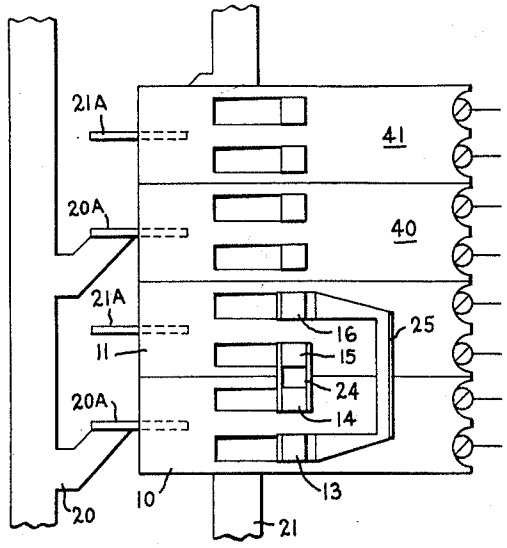
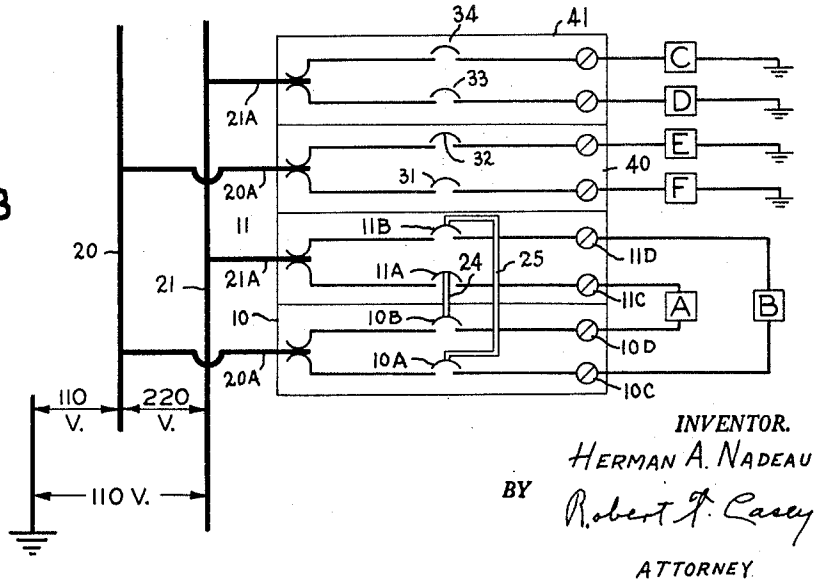


FIG. 2

FIG. 3



INVENTOR.
HERMAN A. NADEAU
BY Robert F. Casey
ATTORNEY

Nov. 24, 1964 H. A. NADEAU 3,158,701

MULTIPLE CIRCUIT BREAKER ASSEMBLY

Filed July 31, 1962 2 Sheets-Sheet 2

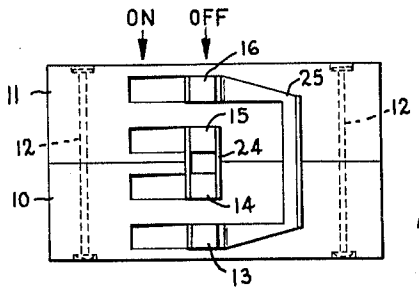


FIG. 4

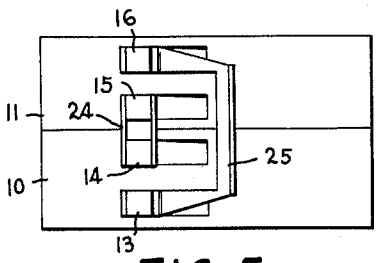


FIG. 5

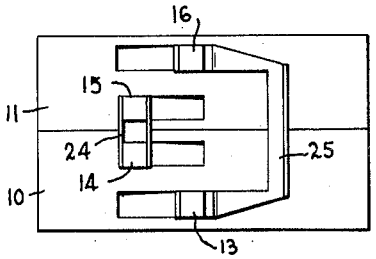


FIG. 6

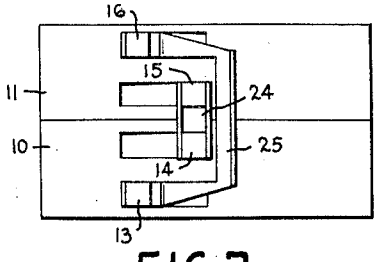
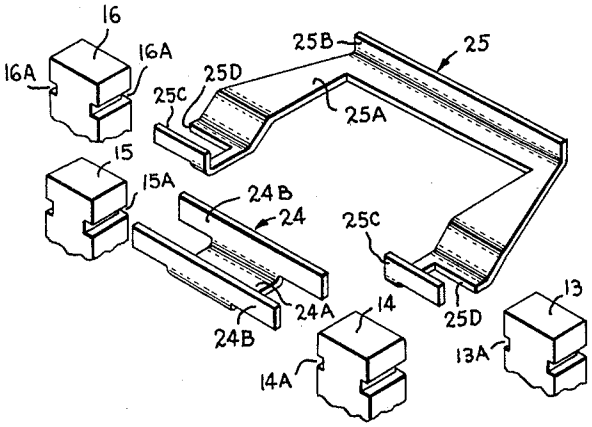


FIG. 7

FIG. 8



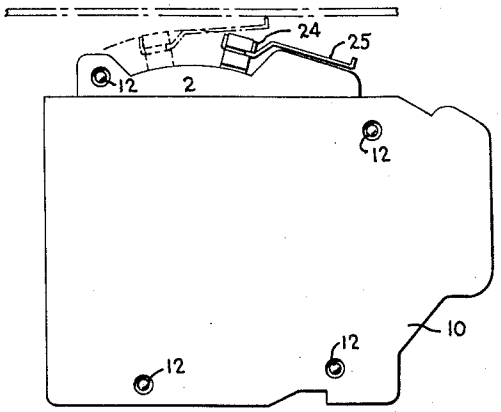


FIG. 9

INVENTOR.
HERMAN A. NADEAU
BY Robert T. Casey
ATTORNEY

United States Patent Office 3,158,701 Patented Nov. 24, 1964

3,158,701

MULTIPLE CIRCUIT BREAKER ASSEMBLY

Herman A. Nadeau, Forestville, Conn., assignor to General Electric Company, a corporation of New York

Filed July 31, 1962, Ser. No. 213,702
2 Claims. (Cl. 200—50)

The present invention relates to multiple circuit breaker assemblies, and more particularly to an assembly of circuit breakers including means for operating selected pairs of said circuit breakers simultaneously.

Electric circuit breakers of the type adapted for use in the control of branch lighting and power circuits of relatively small capacity, such for example as 15 to 50 amperes, according to the prior art, in one particular form, comprise unitary assemblies or "dual" circuit breakers, each such dual circuit breaker comprising a pair of side-by-side single circuit controlling devices. Each dual circuit breaker has a separate manually operable handle for each single pole breaker, a common "line" or power terminal at one end, and a separate load terminal for each such single pole breaker at the other end. Such a dual circuit breaker is shown, for example, in Patent No. 2,992,004, N. L. Miller et al., issued January 19, 1960, and assigned to the same assignee as the present invention.

It is an object of the present invention to provide an assembly comprising at least two dual circuit breakers in side-by-side relation, together with means for operating the handles of the single pole members thereof in selected pairs simultaneously, including means for operating handles of two of said single pole breakers which are not adjacent to each other.

It is a further object of the invention to provide such an assembly including handle operating means which shall permit trip-indicating movement of each of the pairs of operating handles independently of the other pair.

The invention will be more fully understood from the following detailed description, and its scope will be pointed out in the appended claims.

In the drawings,

FIGURE 1 is a perspective view of a multiple circuit breaker assembly incorporating handle-tie means in accordance with the invention;

FIGURE 2 is a top plan view of a circuit breaker assembly, such as shown in FIGURE 1, in a panel assembly;

FIGURE 3 is a schematic representation of the panel assembly of FIGURE 2;

FIGURES 4–7 are top plan views of the circuit breaker assembly of FIGURE 1, with the handles shown in various operated positions;

FIGURE 8 is an exploded perspective view of the circuit breaker handles and handle-tying means; and

FIGURE 9 is a side elevation view of the circuit breaker assembly of FIGURE 1.

In the drawings, the invention is shown in FIGURE 1 as embodied in a multiple circuit breaker assembly comprising a pair of dual circuit breakers **10** and **11**. The dual circuit breakers **10** and **11** are held in side-by-side assembled relation by a plurality of elongated rivets or bolts **12**.

The dual circuit breaker **10** includes a pair of individual circuit breaker units **10A** and **10B** (see FIGURE 3) having operating handles **13** and **14** respectively (see FIGURE 2). The dual circuit breaker **11** includes a pair of individual circuit breaker units **11A** and **11B**, having operating handles **15** and **16** respectively. The dual circuit breaker **10** includes an opening **17** in one end corner of its casing to admit a plug-in type line terminal, in a manner to be described. The dual circuit breaker **11** likewise includes an opening **18** in an end corner thereof to admit a plug-in type line terminal member.

In FIGURE 2, the circuit breaker assembly of FIGURE 1 is shown, together with two additional dual circuit breakers **40**, **41**, in assembled relation with respect to power bus bars **20** and **21** carrying a plurality of line contact members **20A**, **21A**, respectively. One contact member **20A**, as shown, enters the opening **17** of the dual circuit breaker **10**, and energizes both the circuit breaker units **10A** and **10B**. Likewise, the contact line terminal **21A** enters the opening **18** of the dual circuit breaker **11** and energizes the circuit breaker units **11A** and **11B**. See FIGURE 3. The circuit breaker units **10A**, **10B**, **11A**, **11B**, are each provided with separate load terminals **10C**, **10D**, **11C**, **11D**, respectively.

For the purpose of facilitating the operation of the handles of the individual circuit breaker units simultaneously in selected pairs, the assembly also includes handle tying means including an inner-pair handle tie **24** and an outer-pair handle tie **25**.

The construction and assembly of the handle ties **24** and **25** will be best understood by reference to FIGURE 8. As shown in this figure, each of the handle members **13**, **14**, **15**, **16** is provided with a groove **13A**, **14A**, **15A**, **16A**, respectively. The inner handle tie member **24** comprises a flat base portion **24A**, and a pair of upwardly bent side portions **24B**. The handle tie member **24** is assembled in the position shown in FIGURE 1 at the time when the two dual circuit breakers **10** and **11** are assembled together so that a portion of the base **24A** extends into the groove **14A** of the handle **14** and partly into the groove **15A** of the handle **15**. When the breakers **10** and **11** are assembled in relation shown in FIGURE 1, it will be observed that the handle tie member **24** is trapped in place with no other fastening means required.

The outer handle tie member **25** is constructed of flat sheet metal material and comprises a generally U-shaped planar base portion **25A**, having an upwardly bent lip **25B** along the bight portion of the U, and a pair of upwardly bent lip portions **25C** adjacent each of the ends of the U. The base portion **25A** also has corner portions **25D** cut away adjacent the ends of the U. The outer handle tie member **25** is also assembled at the time when the two dual circuit breakers **10** and **11** are assembled together, being placed in a position such that parts of the base portion **25A** adjacent the cut away corners **25D** extend into the grooves **13A** and **16A** of the handles **13** and **16**, respectively. It will be observed that the outer handle tie member **25** is also trapped in place when the circuit breakers **10** and **11** are in assembled relation.

The circuit breaker assembly of the present invention is shown in a typical application in FIGURES 2 and 3. In such an application, the bus bars **20** and **21** are each approximately 110 volts above ground or neutral potential, and there is approximately 220 volts difference between them (see FIGURE 3). Circuits, such as C, D, E, and F of FIGURE 3 which require only 110 volts, may therefore be supplied each by one unit of dual circuit breakers **40**, **41** such as circuit breakers **31**, **32**, **33**, **34**, respectively.

Circuits such as A and B, however, which require 220 volts, must be connected between the bus bars **20** and **21**, rather than between one of the bus bars and ground. The circuit A is therefore connected between the terminal **10D** of the circuit breaker **10B** and the terminal **11C** of the circuit breaker **11A**. The load B is similarly connected between the terminal **10C** of the circuit breaker **10A** and the terminal **11D** of the circuit breaker **11B**.

For safety reasons, it is required that the circuit breakers **10B** and **11A** which supply the load A be operated simultaneously, and that the circuit breakers **10A** and **11B** which supply the load B also be operated simultaneously. It is furthermore required that the handles of the circuit breakers **10B** and **11A** shall be capable of simultaneous

operation to "on" "off," and an intermediate "tripped" position irrespective of the position of the handle members 10A and 11B, and vice versa.

By reference to FIGURES 4 through 7, it will be observed that the assembly provided in accordance with the present invention including the handle tie members 24 and 25 permits this type of operation. Thus in FIGURE 4, all of the handles of the circuit breaker units are in the "off" position. In FIGURE 5 all circuit breaker units are in the "on" position. In FIGURES 6, the breaker handles 14 and 15 are in the "on" position while the breaker handles 13 and 16 are in the "off" position. In FIGURE 7, the handles 13 and 16 are in the "on" position and the handles 14 and 15 are in the "off" position. It will also be observed that the handles 13 and 16 and 14 and 15 are free to move in these pairs to an intermediate "trip indicating position," not shown.

It is an important aspect of the invention that, as shown in FIGURE 9, the handle tying means provided in accordance with the present invention does not extend above the upper ends of the circuit breaker handles which are tied together. This is permitted by reason of the fact that the outer handle tie 25 extends around the inner handle tie 24 in a direction generally parallel to the direction of movement of the handles and substantially at right angles to the direction in which the handles extend.

It will also be observed that the mounting of the handle tie member as provided in accordance with the present invention assures that the member will remain in the orientation as shown, with respect to the circuit breaker assembly, that is, with the bight portion of the U to one side of the line between the connected handles and with the major flat surfaces of the handle tie generally parallel to the plane of the top wall of the breakers. This prevents the handle tie from falling to a position where it would interfere with the panel enclosure cover or with the panel trim plate.

By means of this construction, the handle-tying means of the present invention does not increase the over-all height of the circuit breaker assembly. The multiple breaker assembly of the present invention can therefore be used in enclosures of the same dimensions as required for such dual circuit breakers when used separately.

It will be observed, that by means of the invention, it is possible to utilize two dual-type circuit breakers to provide two "two-pole" circuit breakers. It will also be observed that such an assembly has been provided without requiring any substantial modification of the prior art dual-type circuit breakers.

While the invention has been shown in one particular embodiment, it will be readily apparent that many modifications thereof may be made, and I therefore intend by the appended claims, to cover all such modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A multiple circuit breaker assembly comprising:

(*a*) four circuit breakers in side-by-side alignment in a row, each of said circuit breakers having a top wall and a handle projecting therefrom, each of said handles having an "on" position and an "off" position spaced apart a predetermined distance, all of said handles being in alignment when in said "on" and said "off" positions respectively,

(*b*) means rigidly connecting said circuit breakers together in said side-by-side relation,

(*c*) the first and second circuit breakers in said row having a common line terminal and separate load terminals,

(*d*) the third and fourth circuit breakers in said row having a common line terminal and separate load terminals,

(*e*) a rigid handle tie bar interconnecting said handles of said second and third circuit breakers for simultaneous operation,

(*f*) a generally U-shaped rigid handle tie member of sheet metal material interconnecting said handles of said first and fourth circuit breakers, said U-shaped handle tie member having its bight portion extending parallel to and substantially co-planar with said first handle tie bar, the legs of said U-shaped handle tie member being of greater length than said predetermined distance between said "on" and "off" positions of said handle, to permit operation of said first and fourth circuit breaker handles to said "on" position while said second and third circuit breaker handles remain in said "off" position,

(*g*) each of said legs of said U-shaped handle tie member having a notch therein opening outwardly of said U-shaped handle tie member,

(*h*) said handles of said first and fourth circuit breakers having grooves therein receiving portions of said handle tie member and cooperating with said notches to retain said handle tie member in assembled relation on said handles when said circuit breakers are in said side-by-side relation.

2. An electric circuit breaker panel assembly comprising:

(*a*) a first plug-in dual type circuit breaker including a pair of circuit breaker units in side-by-side relation, each having a top wall and an operating handle projecting therefrom,

(*b*) a second plug-in dual type circuit breaker having a pair of circuit breaker units in side-by-side relation, each having a top wall and an operating handle projecting therefrom, said operating handles of all of said circuit breakers having an "on" position and an "off" position spaced apart a predetermined distance,

(*c*) each of said dual type circuit breakers including an insulating casing having an opening therein for receiving a contact stab in plug-in electrical engagement with both of said circuit breaker units thereof,

(*d*) means connecting said first and second dual type circuit breakers rigidly together in side-by-side relation with all of said handle members in alignment in a first direction in at least one position thereof, two of said circuit breaker units comprising an inner adjacent pair and the other two circuit breaker units comprising an outer non-adjacent pair,

(*e*) means interconnecting the operating handles of said inner pair of circuit breaker units for simultaneous operation, and

(*f*) a generally U-shaped rigid handle tie member of sheet metal material interconnecting said handles of said outer pair of circuit breaker units, said U-shaped handle tie member having its major planar surface parallel to said top walls of said circuit breakers, each of the legs of said U-shaped handle tie member being of greater length than said predetermined spacing of said "on" and "off" positions of said operating handles and having a notch therein opening outwardly of said U-shaped handle tie member,

(*g*) said handles of said outer pair of circuit breaker units each having grooves therein receiving portions of said handle tie member and cooperating with said notches to retain said handle tie member in assembled relation on said circuit breakers.

References Cited in the file of this patent

UNITED STATES PATENTS

3,069,518 Soos ..... Dec. 18, 1962

OTHER REFERENCES

"Square D Multibreakers," Catalog 37, Section 4000, June 1940, page 4011.