

No. 840,068.

PATENTED JAN. 1, 1907.

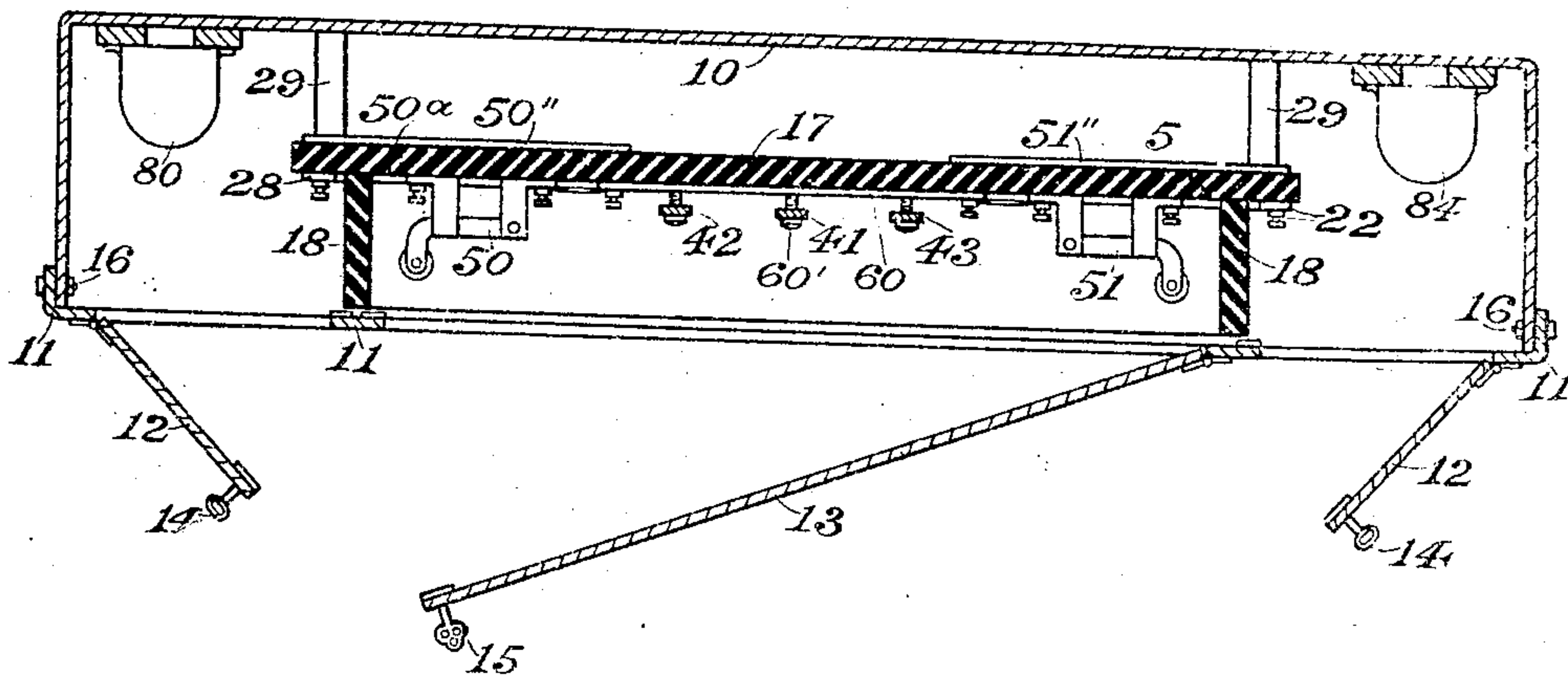
E. N. LAKE.

PANEL BOARD FOR ELECTRICAL DISTRIBUTION.

APPLICATION FILED JULY 24, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Harold C. Prado

David S. Hulfish

Edward N. Lake,
Inventor.

by Samuel G. McMeen
Attorney.

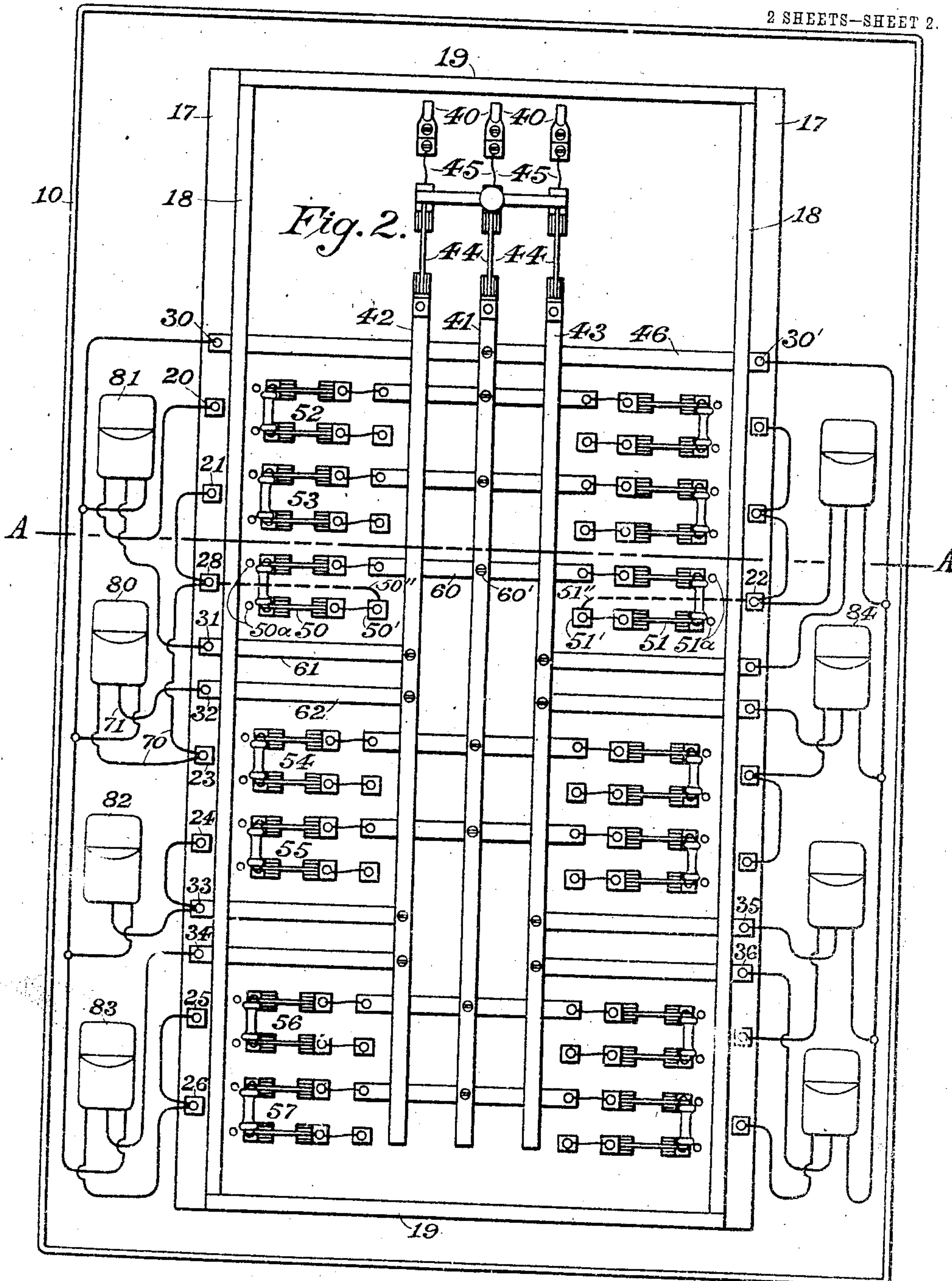
No. 840,068.

PATENTED JAN. 1, 1907.

E. N. LAKE.
PANEL BOARD FOR ELECTRICAL DISTRIBUTION.

APPLICATION FILED JULY 24, 1905.

2 SHEETS—SHEET 2.



Witnesses:
Harold C. Prado.
David S. Hulfish.

Edward N. Lake
Inventor.
by Samuel G. McMeer
Attorney.

UNITED STATES PATENT OFFICE.

EDWARD N. LAKE, OF CHICAGO, ILLINOIS.

PANEL-BOARD FOR ELECTRICAL DISTRIBUTION.

No. 840,068.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed July 24, 1905. Serial No. 270,960.

To all whom it may concern:

Be it known that I, EDWARD N. LAKE, a citizen of the United States of America, and a resident of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Panel-Boards for Electrical Distribution, of which the following is an exact and concise description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to panel-boards such as are used in the distribution of current for electric lighting and other purposes in buildings where many local circuits are fed from main feed or power circuits, and particularly to panel-boards for such instances where meters are installed to record the amount of energy consumed by each of the local load-circuits.

My objects are to provide a sightly and convenient means for connecting such local load-circuits to the main power-circuits, to provide for the grouping of any desired local load-circuits together as a single load unit for measurement of the energy consumed by them, to provide means for connecting meters to the power-mains and to such load units as may be desired, and to provide separate means for access to the switches and fuses forming essential parts of such a panel-board and to the meters and their connecting-circuits.

Two figures accompany this specification, in which—

Figure 2 shows a front elevation of my panel-board with the front portion, consisting of doors and their supporting-frames, removed; and Fig. 1 shows a section of Fig. 2 on the line A A.

The construction of the panel-board is as follows:

A main case or body 10 contains all of the panel-board apparatus and the meters and is provided with a front portion 11, furnishing mounting for three doors 12 12 and 13. These three doors are provided with separate locks. The locks giving entrance to the meters and to the meter connections are similar and operable by the same or similar keys, and the lock giving access to the bus-bars, switches, and fuses is different, so that its key will not give access to the meters and their connections. This difference in locks is indicated in Fig. 1 by the similarity in the exposed portions of the keys 14 and 14 on doors 12 and 12 and by the differently-de-

signed exposed portion of the key 15 in door 13. The object to be accomplished is to permit access through door 13 to classes of workmen which it is desired to exclude from the meters and terminals accessible only through doors 12 and 12, as by access to the terminals of the meter-circuits a falsification of the records could be effected, to the end of defrauding the parties who are operating the power system and charging the consumers according to the meter indications. The entire front of the case is held in place by bolts, as 16 and 16, the bolts themselves being accessible only by use of keys of the style of 14. Ports for power-circuits and local load-circuits may be provided, as is usual in all similar constructions, through the back or sides of the case 10.

Within the case 10 a slab of insulating material, as slate or marble 17 is mounted upon studs 29, attached to the back of the case, switching and circuit apparatus being mounted upon the face of this slab and connected in most instances by conductors passing through the slab, as shown.

Structural side slabs, preferably of insulating material, are placed at 18 and 18, closing the sides of the space accessible through door 13, and similar slabs are placed at 19 and 19 to close the top and bottom of the space, thus effectually preventing access through door 13 to the meters and connections protected by doors 12 and 12 and also providing additional protection against dust for the apparatus mounted on the face of the slab 17. Meters 80 81 82 83 84, &c., are mounted in the case in the side spaces accessible through the doors 12 and 12, the meters shown in the figures being of the wattmeter type, requiring the connection of the pressure-circuit in multiple and of the load or service circuit in series. These meters may be mounted in the space assigned for them in any manner required by the design of the meter. The side slabs or ribs 18 and 18 are so placed upon the main slab 17 that the edges of the main slab project beyond the side slabs and into the spaces occupied by the meters to a sufficient distance to permit the mounting in the meter-compartment of terminals, as 20 21 22 23 24 25 26 28 and 30 31 32 33 34 for the connection of circuit-wires.

On the face of the slab 17 are mounted, first, terminals 40, adapted to connect with the main power leads or feed-wires, bringing

to the panel-board the electric current for distribution; second, bus-bars 41 42 43, (shown in Fig. 1 as held at clearance distance above the face of the slab 17 and 5 shown in Fig. 2, as extending practically throughout the length of the slab 17;) third, a main switch 44, adapted to isolate the bus-bars from the power-mains; fourth, fuses 45, adapted to isolate the bus-bars from the 10 power-mains; fifth, a pressure-bus 46, connected with the bus-bar 41 and extending beyond the side slabs 18 and 18 to terminals, as 30 and 30', in the meter-compartments; sixth, a plurality of load-circuit or service- 15 circuit switches, as 50, each a double-pole single-throw switch, as shown, with one pole connected through a fuse to a conducting-link 60, connected with the bus-bar 41, as indicated, by the screw 60', and with the re- 20 maining pole connected through a fuse to a terminal block 50', which is connected by a conducting-strap 50'' on the back of the slab 17 to the terminal 28, associated by location with the switch 50, but located on the face 25 of the slab 17 on that edge which projects into the meter-compartment. Adjacent to the two poles of the switch 50 at that end of the blades not connected as above the holes 50^a are drilled through the slab 17 and are 30 adapted to permit load-circuit wires to be brought through the slab 17 to be connected to the free terminals of the switch 50, located adjacent to the holes. A circuit thus will be 35 formed from the bus-bar 41 through connection indicated by screw 60', conducting-link 60, fuse, one side of switch 50, load-wire passing out through one of holes 50^a, through the external load element associated with that load-circuit, returning to the panel-board 40 over the associated load-wire leading through the remaining hole 50^a to the remaining side of the switch 50, thence through fuse to terminal 50' and through conducting-strap 50'' to terminal 28 in the meter-compartment, 45 thus constituting the terminal 28 a load-terminal or service-terminal for meter-switching. Seventh, a plurality of conducting-bars, as 61 62, connected with bus-bars 42 and 43 and passing through side slabs 18 to terminals, 50 as 31 and 32, in the meter-compartments. By "load-circuit" or "service-circuit" in the foregoing is meant that element of electrical power distribution which comprises the power-consuming branch from the power- 55 mains or bus-bars and which includes the power-consuming elements, as lamps or motors and the wires leading thereto.

In the meter-compartments are located meters, indicated in the drawings as being of 60 the wattmeter type, requiring one of the internal circuits of the meter to be connected in series with the load-circuit whose consumption of energy is to be measured and another internal circuit of the meter to be 65 connected directly across the power-circuit

furnishing the energy consumed. These two internal circuits of the meter may have a common terminal, as indicated in the middle terminal of the meters shown, the right-hand terminal on the drawings being assumed 70 to be the pressure-terminal, requiring the full voltage of the power-circuit to be placed on the middle and right-hand terminals, and the left-hand terminal of the meters, as shown, being assumed to be the series ter- 75 minal, requiring the circuit whose consumption of energy is to be measured to be carried in series through the middle and left-hand terminals of the meter. The right-hand terminals of all the meters may be connected to 80 terminal 30 or 30', as shown in Fig. 2, and thus connected to bus-bar 41, while the middle terminals of all meters require to be connected to one of the remaining 'bus-bars directly to bring to the meter the full difference 85 of potential existing between the bus-bars. The remaining or left-hand terminal of the meter requires to be connected through the load-circuit to the bus-bar 41. In my design of panel-board the connection for the 90 middle terminals of the meters may be obtained through the terminals 31 32 33 34 35, &c., by which it is seen that any meter may be connected to either of the bus-bars 42 43, it being noted also that the terminals 31 32, 95 &c., are so distributed along the edge of the slab 17 as to be conveniently accessible to the different meters in their probable locations, so as to require a minimum connecting-wire where no arbitrary circuits are required. 100 Thus meter 83 may have its middle terminal connected to meter-terminal 36, and thereby to bus-bar 43; but preferably meter 83 should be connected to the adjacent meter-terminal 34, and thereby to bus-bar 42. In 105 my design of panel-board the connection for the left-hand terminal of the meter may be obtained through the terminals 20 21 22 23 24 25, &c., it being shown in Fig. 2 that in this detail the left-hand terminal of any 110 meter may be connected to any load-circuit terminal, as 20 21, &c., or to a plurality of such terminals, thus placing any meter upon any load-circuit or placing any desired load-circuits upon the same meter. In the draw- 115 ings meter 81 is shown measuring energy given to a load-circuit through switch 52. Meter 80 serves circuits connected with switches 53, 50, and 54. Also terminal 24 is shown connected directly to terminal 33, 120 thus giving service through switch 55 without measuring the amount of energy consumed. Meter 82 is shown idle. To complete the circuit above traced from bus-bar 41 to terminal 28, it passes from terminal 28, 125 over jumper-wire 70, through meter 80, and over wire 71 to terminal 32, thence by bar 62 to bus-bar 42.

I do not wish to limit myself in all respects to the details herein shown, as many varia- 130

tions may be made without departing from the spirit of my invention.

What I claim is—

1. In a panel-board for electric distribution, the combination of a mounting-slab for switches and fuses, terminals for load-circuits upon said slab, and terminals for meters upon said slab and interspersed with said terminals for load-circuits, substantially as described.

2. In a panel-board for electrical distribution, the combination of a mounting-slab for switches and fuses, terminals for load-circuits upon said slab, each load-circuit terminal being associated with a switch, and terminals for meter-circuits upon said slab, said load-circuit terminals and said meter-circuit terminals being interspersed, substantially as described.

3. In a panel-board for electrical distribution, the combination of a mounting-slab for switches and fuses; bus-bars on said slab; terminals on said slab; circuit branches extending from one of said bus-bars through switches and fuses to load-terminals on said slab, other circuit branches extending from one of said bus-bars directly to terminals on said slab; said direct circuit-branch terminals being interspersed with said circuit-branch terminals with associated switches, substantially as described.

4. In a panel-board for electrical distribution, the combination of a mounting-slab; bus-bars on said slab; switches on said slab; a plurality of terminals on said slab and located in groups at or near the edges of said slab; branch circuits from one of said bus-bars through said switches to some of said terminals; and branch circuits from each of said bus-bars directly to others of said terminals, substantially as described.

5. In a panel-board for electrical distribution, the combination of a mounting-slab; bus-bars on said slab; switches on said slab; a plurality of terminals on said slab and located in groups at or near the edges of said slab; branch circuits from one of said bus-bars through said switches to some of said terminals; branch circuits from each of said bus-bars directly to others of said terminals; meters located adjacent to said terminals; and conductors connecting each of said meters with terminals of both classes, substantially as described.

Signed by me at Chicago, county of Cook, State of Illinois, in the presence of two witnesses.

EDWARD N. LAKE.

Witnesses:

DAVID S. HULFISH,
EVA A. GARLOCK.