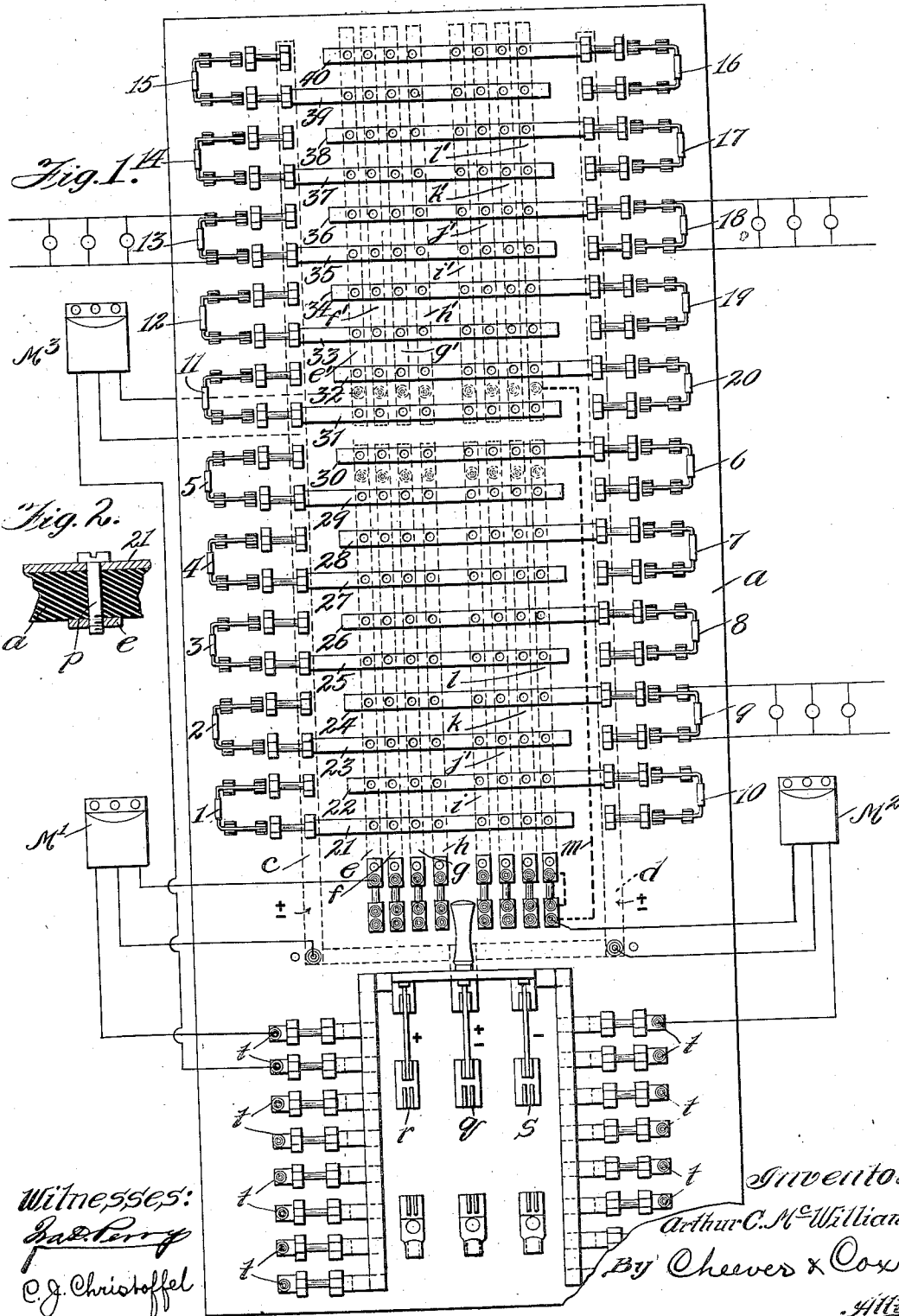


A. C. McWILLIAMS.
METERING PANEL BOARD.
APPLICATION FILED OCT. 23, 1907.

Patented Oct. 5, 1909.
2 SHEETS—SHEET 1.

936,252.

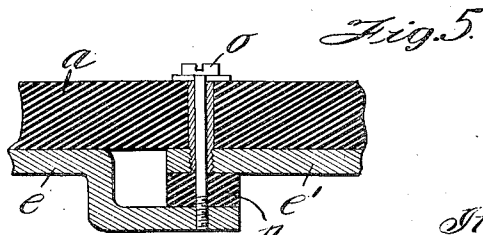
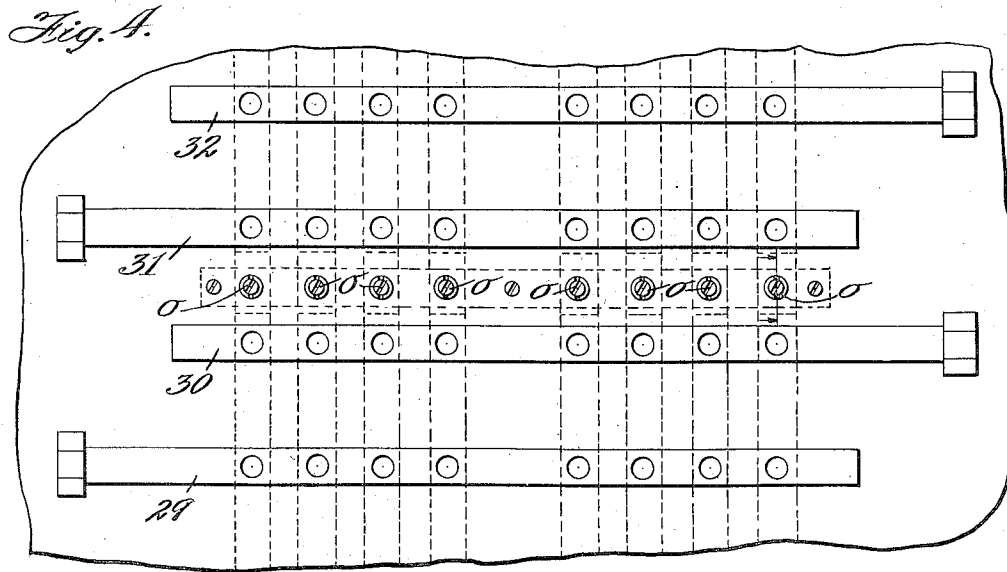
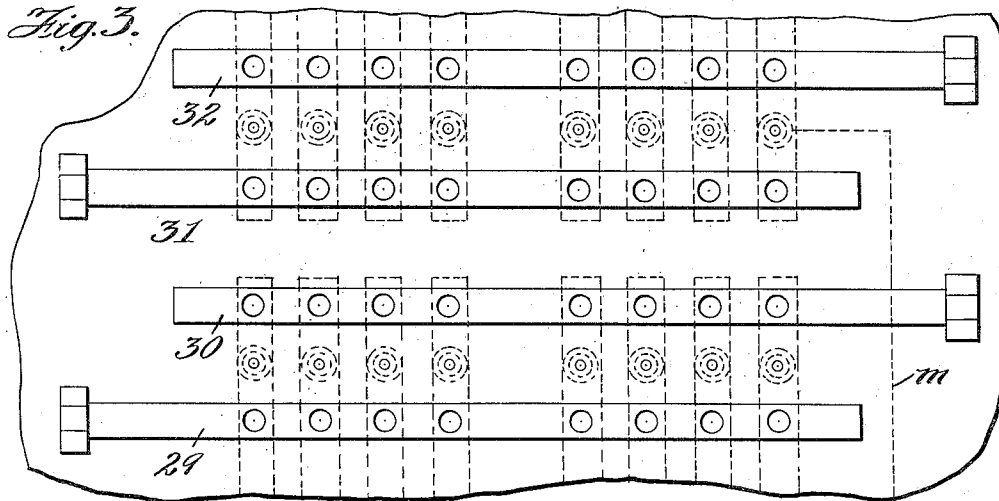


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2 SHEETS—SHEET 2.



Witnesses:

Ed. D. Perry
L. J. Christoffel

Inventor:

Arthur C. McWilliams

By Cheever & Cox

Attys.

UNITED STATES PATENT OFFICE.

ARTHUR C. McWILLIAMS, OF CHICAGO, ILLINOIS.

METERING PANEL-BOARD.

936,252.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed October 23, 1907. Serial No. 398,832.

To all whom it may concern:

Be it known that I, ARTHUR C. McWILLIAMS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Metering Panel-Boards, of which the following is a specification.

My invention relates to panel boards for electrical distribution and is especially adapted for use in connection with the metering of light circuits in office buildings and the like where the different tenants pay for the current used by them.

The type of board here shown is analogous to the one shown in my application for United States Letters Patent, filed April 21, 1906, Serial No. 313,070. It is also analogous in certain respects to my Patent No. 872,670, issued December 31, 1908, and to my Patent No. 931,464 issued August 17, 1909. I do not herein claim the inventions described in said previously filed applications.

My present invention is more closely allied to the first one of the above mentioned applications, but in this case there is afforded a greater variety of groupings of the translating and metering circuits. This will be clearly elucidated in the following description and claims.

I obtain my object by the apparatus illustrated in the accompanying drawings, in which:

Figure 1 is a general front elevation of a panel board embodying my invention. Fig. 2 is a fragmentary detail view showing the preferred manner of plugging through from one set of transverse conductors to the other. Fig. 3 is a fragmentary elevation showing the middle portion of the board where the vertical conductors are interrupted or discontinued in order to form the connectable divisions or sections of the board. Fig. 4 is similar to Fig. 3 but shows a modification in the method of connecting the vertical conductors. Fig. 5 is a fragmentary sectional view showing in detail the method of connecting the conductors illustrated in Fig. 4.

Similar reference characters denote similar parts throughout the several views.

In order to facilitate an understanding of the present invention I shall assume that the panel board is to be used in connection with the measuring apparatus for a single floor of an office building containing twenty trans-

lating or consumption circuits. I shall assume that the floor in question has twenty consumption circuits and is so arranged that it may under possible circumstances accommodate sixteen different tenants whose consumption circuits would have to be metered separately, thus requiring sixteen meters. I shall also assume that the floor is so arranged that it might be entirely occupied by a single tenant in which case a single meter would be sufficient for all of the consumption circuits on the floor. For convenience I have numbered the terminals of these consumption circuits from 1 to 20 inclusive.

The board proper which consists of marble, slate or other suitable insulating material is indicated by the reference character *a*. The aforesaid terminals 1 to 20 inclusive are mounted upon said board preferably on the front thereof as shown. These terminals are connected on one side, (preferably through suitable fuses) with the permanent conductors numbered from 21 to 40 inclusive. On the other side said terminals are suitably connected with the bus bars *c* and *d* mounted in the present instance on the back of the board. Said terminals are preferably switches, and the parts are so arranged that when the circuit is established one side of a consumption circuit is in electrical connection with one of the horizontal conductors 21 to 40 inclusive while the other side of said circuit is in electrical connection with the bus bar *c* or bus bar *d* as the case may be. In the design here shown the conductors on the front of the board lie horizontal and extend inwardly alternately from opposite sides of the board as clearly shown in Fig. 1. The purpose of this arrangement is to economize space and is a feature adverted to and claimed in the first of the above mentioned pending applications. When thus arranged, consumption terminal 1 is in electrical connection with conductor 21 and consumption terminal 10 on the opposite side of the board is in electrical connection with the adjacent conductor 22.

Arranged in a plane parallel to but separate from the plane of the horizontal conductors aforesaid are transverse conductors grouped in pairs and lettered *e, e', f, f', g, g', h, h', i, i', j, j', k, k', l, l'*. The pair *e, e'* together crosses the entire set of horizontal conductors and under ordinary conditions each one of said conductors *e, e'* will cross one half of the set of horizontal conductors.

The conductor *e* is adapted to be electrically connected to the conductor *e'*, and when thus connected, there is, in effect, a single continuous conductor crossing all of the horizontal conductors. Similarly the conductor *f* is adapted to be connected to the conductor *f'*, the conductor *g* to the conductor *g'* and so on. The vertical conductors are suitably connected with the source of supply which in the present three wire arrangement is the central supply terminal *q*. The connections are made in any suitable manner preferably from the back of the board and need not be described. The bus bars *c* and *d* are electrically connected to the positive and negative supply terminals *r* and *s* respectively. It will be understood however that this type of board is applicable also to a two wire system and the essential characteristic is that the vertical conductors are in connection with a different supply terminal from the horizontal conductors. The bus bars *c* and *d* are in electrical connection with the meter terminals *t*. These vertical conductors are substantially in alinement in bars. Of course the board might be constructed in which there were more than two vertical conductors in alinement with each other and adapted to be electrically connected but two conductors arranged in this manner illustrate the principle of this invention. Various means may be employed for electrically connecting the two vertical conductors of any pair for example a removable wire *M* shown in dotted lines at the right of Figs. 1 and 3 may be employed or the vertical conductors themselves may have their ends brought into such relationship that a meter stud may be made to connect them. This last type of connection is illustrated in Figs. 4 and 5 in which case the ends of the bars are brought nearer together with an insulating block *n* between them and electrical connection is made by means of a stud *o*.

The vertical and horizontal permanent conductors are adapted to be electrically connected at their points of intersection. This connection may be accomplished in various ways a suitable construction being indicated in detail in Fig. 2. In this form a stud *p* is employed which extends from one conductor to another one crossing it.

Operation: Let it be supposed that three meters *M'*, *M*², *M*³ are installed. Let it be supposed that the meter *M'* is in electrical connection on one side with the vertical bar *e* and on the other side with the terminal *t* which leads to the bus bar *c*. Let it be assumed that the meter *M*² is connected on one side of the vertical conductor *l* and on the other side is connected to the bus bar *d*. Let it be assumed that the meter *M*³ is connected on one side to the vertical conductor *e'* and on the other side to the terminal *t* which is connected to the bus bar *c*. With this par-

ticular arrangement of meters any one of the consumption circuits numbered from 1 to 10 inclusive may be thrown unto the meter *M'* by blocking through from the vertical conductor *e* to the proper horizontal conductor crossing it. For example consumption circuit 9 may be thrown unto meter *M'* by inserting a block at the intersection of conductors *e* and 24. Similarly any one of the consumption circuits numbered from 1 to 10 may be thrown unto the meter *M*² by blocking through from the bar *l* to the proper cross conductor. Similarly any one of the consumption circuits numbered from 11 to 20 inclusive may be thrown upon the bar *e'*; for example, consumption circuit 13 may be thrown on to the meter *M*³ by plugging through at the intersection of the conductors *e'* and 35. It will thus be seen that when the vertical conductors *e* and *e'* are disconnected, as they ordinarily will be any one of the consumption circuits numbered from 1 to 10 inclusive may be thrown unto meter *M'*. This metering is all confined to the lower half of the board. The upper half of the board may be devoted to the metering of another set of consumption circuits numbered from 11 to 20 inclusive. When the vertical bars on the upper half of the bar are electrically disconnected from the vertical conductors on the lower half of the board the apparatus is duplex. The consumption circuits numbered from 1 to 10 can not be thrown unto any meter but only unto a selected one of the meters associated with the lower half of the board. Similarly the consumption circuits numbered from 11 to 20 inclusive are confined to some one of the meters associated with the upper half of the board. This range of variation however is amply sufficient for all ordinary cases. But now suppose that a single tenant rents the whole floor. In order to save cost of meters and unnecessary competition it will be desired to throw all of the twenty consumption circuits upon some one meter. This contingency is provided for in my board for all that is necessary is to connect a meter with one of the vertical conductors for example the conductor *e* and then connect the conductor *e* with the conductor *e'*. Any one or all of the consumption circuits may then be thrown upon the meter *M'*. My board thus has the advantage of economizing space and material without sacrificing in any degree whatever the possible range of variations in metering. The economy in space and material is due to the fact that I have provided what is in reality a double metering panel board so arranged that by the mere connection of two of the permanent conductors any one of the double number of consumption circuits may be thrown unto any one of the meters. Viewing this invention from a different aspect it may be said that twice as

many meters (and hence twice as many tenants) may be accommodated with a given width of board as has heretofore been possible and at the same time by the mere connection of two permanent conductors every one of the consumption circuits may be thrown unto a single meter.

What I claim as new, and desire to secure by Letters Patent, is:

10 1. A panel board for electrical power distribution comprising a board of insulating material and two sets of conductors permanently mounted on said board and arranged in two parallel planes separated from each other; the conductors of one set running transverse to the conductors of the other set and said conductors being adapted to be electrically connected at their points of intersection, and the conductors of one set being discontinuous but adapted to be electrically connected for the purpose described.

25 2. A panel board for electrical power distribution having supply mains, a plurality of sets of conductors running transversely to each other and lying in two different superposed but separated parallel planes, one of said sets of conductors being so arranged that two conductors occur in the same straight line, said transverse conductors being adapted to be electrically connected at their points of intersection, means for electrically connecting one of said supply mains to one set of said transverse conductors, and other means for electrically connecting another of said supply mains to another set of said transverse conductors.

30 3. In a panel board, the combination of a board of insulating material, meter and consumption terminals and a plurality of sets of permanent conductor bars running transversely to each other and arranged in two superposed but separated parallel planes, the bars of one of said sets being arranged in

pairs with the two bars of a pair in alignment, said transverse conductor bars being adapted to be electrically connected at their points of intersection and one set of bars running to the meter terminals and the other set to the consumption terminals.

4. In a panel board, the combination of a board of insulating material, meter and consumption terminals and a plurality of sets of permanent conductor bars running transversely to each other and arranged in two superposed but separated parallel planes, the bars of one of said sets being arranged in pairs with the two bars of a pair in alignment, said transverse conductor bars being adapted to be electrically connected at their points of intersection and one set of bars running to the meter terminals and the other set to the consumption terminals, and means for electrically connecting the two bars of a pair together.

5. In a panel board, the combination of a board of insulating material, meter and consumption terminals and a plurality of sets of permanent conductor bars running transversely to each other and arranged in two superposed but separated parallel planes, the bars of one of said sets being arranged in pairs with the two bars of a pair in alignment, one set of said conductor bars running to the meter terminals and the other set to the consumption terminals, means for plugging through from any one of said conductor bars to any one crossing it, and means for electrically connecting the two bars of a pair together for the purpose described.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

ARTHUR C. McWILLIAMS.

Witnesses:

HOWARD M. COX,
C. J. CHRISTOFFEL.