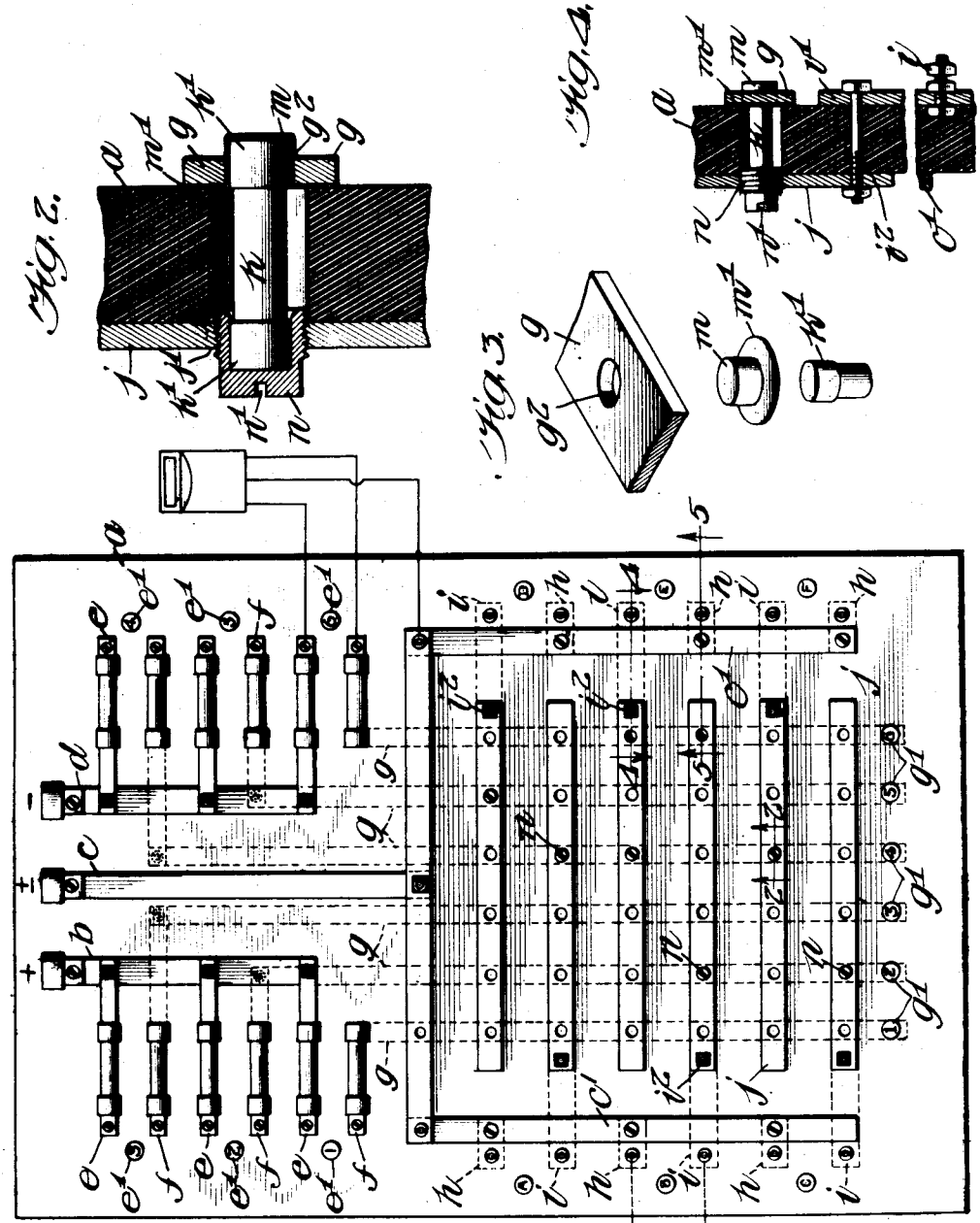
No. 872,670. PATENTED DEC. 3, 1907.

A. C. McWILLIAMS.

METERING PANEL BOARD.

APPLICATION FILED MAY 8, 1906.

2 SHEETS—SHEET 1.



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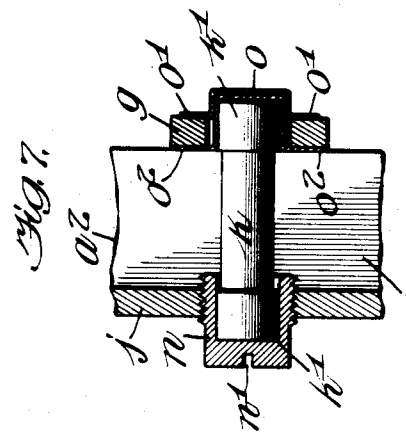


Fig. 7.

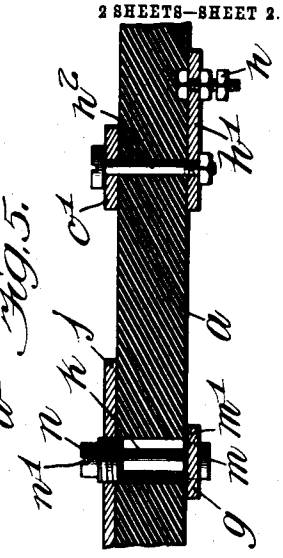


Fig. 5.

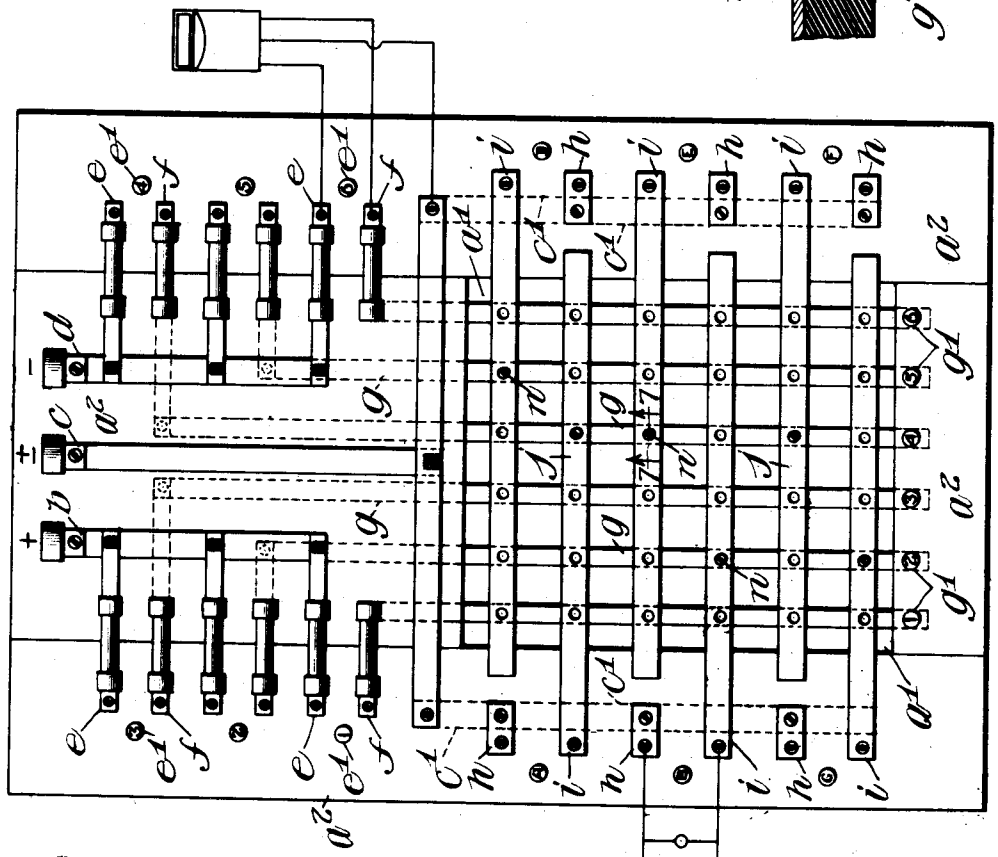


Fig. 6.

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UNITED STATES PATENT OFFICE.

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METERING PANEL-BOARD.

No. 872,670. Specification of Letters Patent. Patented Dec. 3, 1907.

Application filed May 8, 1906. Serial No. 315,741.

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, especially of the type used in office buildings and elsewhere for enabling the operating electrician to connect the various consumption circuits with the supply mains or bus bars through the desired meter.

The type of board here shown is similar in many respects to the one described and shown in the application filed by me Sept. 30, 1905, Serial No. 280,802 and I do not wish to be understood as herein claiming any of the features or characteristics there shown. In that application as in this, there are two sets of conductor bars, one set running transversely to the other so that any consumption circuit may be thrown on any meter circuit by merely completing electrical connection at the intersections of the two proper cross conductor bars. In the apparatus of the previous application however, no provision was made for inserting fuses except on the border of the panel. But in many buildings the available space for panel boards is very restricted so that in some cases a board of the type shown in the previous application could not be used.

The object of the present invention is to provide a board of minimum superficial area but supplied with a complete set of fuses.

Briefly speaking this object is accomplished by providing cross conductors of opposite polarity as in the previous application but in addition providing means whereby the fuse itself may constitute the plug or stud for electrically connecting said cross conductors.

As ancillary to the main object it is my purpose to provide parts of simple and durable construction, easily attached or removed, and adapted to afford perfect contact.

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

Figure 1 is a front or face view of the complete apparatus. Fig. 2 is a front to rear section of the same taken at a point of intersection of two cross-conductors. Fig. 3 is a perspective view illustrating the relative positions of the parts at the rear contact cap. Fig. 4 is a sectional view taken for example on the line 4—4 Fig. 1 and showing one construction whereby a circuit wire may be connected to a cross-conductor. Fig. 5 is a sectional view analogous to Fig. 4, but taken, for example, on line 5—5, Fig. 1. Fig. 6 is a front face view of a modified form of apparatus in which the board or slab itself is made in sections with a rectangular opening at the cross-conductors, this construction avoiding the necessity for drilling a separate hole through the slab at each point of intersection of said conductors. Fig. 7 is a sectional view similar to Fig. 2 but taken on line 7—7 Fig. 6, and also showing a modification in the form of the rear contact cap.

Similar letters refer to similar parts throughout the several views.

Referring first to the form of apparatus shown in Figs. 1 to 5 inclusive: the board proper *a* consists of marble, slate or other suitable insulating material and has mounted thereon the permanent parts of the apparatus. The present design is for a three wire system with supply mains or bus bars *b*, *c*, *d*, all of different potential although the outer bars *b* and *d* might be of the same potential without altering the theory of operation of the apparatus. The meter terminals *e*, *f*, occur in pairs, one terminal *e* of each pair being connected to the nearest one of the bus bars *b* or *d*. The companion terminal *f* of each pair is connected to one of a set of cross-conductor bars *g* which in the present instance are mounted upon the back of the board and are arranged vertically. For convenience these cross-conductors *g* are identified by means of plates *g'* which in the present instance are numbered 1, 2, 3, etc.; and each pair of meter terminals is correspondingly identified by means of the plates *e'*.

The bus bar *c* is permanently connected with one terminal *h* of each pair of consumption terminals *h*, *i*. The preferred construction is best shown in Figs. 1 and 5, where the terminal consists of a binding post *h* electrically connected to the conducting strip *h'* on the back of the board, which strip is electrically connected by means of the stud h^2 to one of the bars *c'* leading to the bus bar *c*. By preference bars *c'* are arranged near the borders of the board parallel to the bars *g*.

Crossing the conductor bars *g* preferably at right angles thereto and at a distance in front of them sufficient at least for insulation, are the cross-conductors *j*, there being

one of said conductors j for each one of the consumption terminals i. In the present design conductors j are mounted on the front of the board and are electrically connected with terminals i in any suitable manner, preferably the one best shown in Figs. 1 and 4. In these figures said terminals consist of binding posts on the back of the board electrically connected to the strips i' which are electrically connected to the conductors j by means of the studs i^2.

The preferred means of fusibly plugging through directly from one set of cross-conductors to the other, which direct fusible plugging touches one of the vital features of my invention, will now be referred to. The short fuse k having contact caps k' at the extremities is a wellknown article in the market and requires no description except to say that it is adapted to afford electrical connection between any two conductors in electrical contact with its end portions or caps k' above mentioned.

Although I do not consider my invention as limited to any particular form of attachments of the fuse to the cross-conductors j and g, one preferred form is illustrated in detail in Fig. 2, in which a thin pressed metal cap m fits into a suitable aperture g^2 in the conductor g and is provided with an annular flange m' which is adapted to lie between conductor g and the board or slab a. The said cap is adapted to fit over the cap k' of the fuse, and when the parts are forced together by means of the screw cap n or otherwise, electrical connection will be completed from conductor g to cap k' through the cap m.

The screw-cap n above mentioned is, in the preferred form (see Figs. 2 and 7) adapted to fit closely over the remaining cap k' of the fuse, and is exteriorly threaded to screw into the correspondingly threaded aperture j' in the cross-conductor j. Said screw-cap is provided with a notch n' for receiving a screw-driver, or may be adapted for a spanner wrench or other suitable tool for screwing the cap tightly down into position to force the parts together and thus complete the electrical contact. It will be understood that there is an aperture j' in each of the conductors j at each point of intersection with the cross-conductors g. Similarly there is an aperture g^2 in each of the cross-conductors g at each point of intersection with the conductors j. In consequence, in operation, when the electrician desires to connect any consumption circuit with any meter circuit, all he has to do is to drop a fuse k into position at the intersection of the proper cross-conductors, and then complete the electrical connection by screwing home a cap n.

Although I do not wish to be considered as restricted to any special type of fuse, it may be of interest to state that standard and wellknown fuses are now on the market having the appearance and proportions of the fuse shown in Figs. 2 and 7, and that a common size of fuse of this type is approximately two inches long. A fuse of this dimension readily adapts itself to a board of my design, especially when the cross-conductors j and g are mounted on opposite sides of a slab of ordinary thickness, for example, one inch, or thereabout. With cross-conductors j and g of common thickness, for example, one fourth of an inch or thereabout, the parts when assembled, screw-cap and all, will project but slightly in front of and to the rear of the outer surfaces of the conductors j and g. The board will thus have a neat appearance and will be free from objectionable projections. From the above it is clear that when the consumption circuits are connected with the meter circuits and supply mains, there will be a fuse interposed between the cross-conductors j and g without the providing of any space at the edges of the board, thus greatly reducing the superficial area of the complete apparatus and rendering it possible to use the same in many places where a board of greater dimensions could not be placed.

Although I have shown conductors j and g mounted upon opposite sides of the board, it would, of course, be possible to mount them upon the same side, it being necessary merely to keep the plane of the cross-conductors far enough apart for air insulation.

In the form of apparatus shown in Figs. 1 to 5 inclusive, the board or panel a is shown to be drilled at every point of intersection of the cross-conductors. This requires considerable drilling, which may be obviated by constructing the panel as shown in Fig. 6, in which an open area a' is left in the board somewhat more than co-extensive with the complete set of points of intersection of the cross-conductors. If it is desired to cheaply construct the apparatus, this area instead of being cut out of a solid slab, may be formed by using a board comprising a set of four rectangular sections a^2, as illustrated. With this open construction shown in Fig. 6, the conductors g and j will cross in the air, but they also may be fusibly connected by plugging through from one to the other in the manner already indicated. In the form of apparatus shown in Fig. 6, all of the terminals are on the front of the board, the horizontal conductors extending alternately to the right and left to the terminals i, and the terminals h being directly connected to the conductors c'.

The preferred form of contact cap for use in connection with the construction shown in Fig. 6 is illustrated in Fig. 7. In this form the cap o has two annular flanges adapted to contact the conductor g on opposite surfaces thereof, so that the cap may be self-retaining in position. A cap of this

design may be constructed of two interfitting caps of pressed sheet metal secured together by brazing or otherwise.

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

1. In a panel board the combination with the board, of two sets of cross conductors, said sets being in two parallel planes separated from each other for insulation; fuses of a length approximately equal to the distance between said sets of cross conductors, a metallic cap fitting into the conductors of one set, and adapted to receive one end of a fuse, and screw caps screwing into the conductors of the other set and adapted to receive the other end of the fuse whereby electrical connection is made from one conductor to the other.

2. A panel board having permanent conductors crossing each other in parallel planes located a slight distance apart; and detachable fuse plugs adapted to connect any two conductors at the point of crossing, the length of the plug being approximately equal to the distance from one conductor to the one crossing it, and said plugs being arranged perpendicularly to the planes of said conductors, and caps fitting over the ends of said plugs and making electric contact therewith, said caps being adapted to make electric contact with two of said permanent conductors at the point of crossing thereof.

3. In combination, an insulating base or panel; two sets of conductors permanently mounted on said base in separate parallel planes, the conductors of one set running transverse to the conductors of the other set, said conductors being apertured at their points of intersection; a fuse plug extending perpendicularly from one conductor to another one crossing it, a cap fitting in the aperture of one conductor for affording electrical connection between the plug and the conductor; and a screw cap fitting the other end of the plug and screwing into the other conductor for holding the plug in place and establishing electrical connection between it and the conductor.

4. In combination, an insulating base, cross conductors permanently mounted thereon and lying in separate parallel planes, a cylindrical fuse plug having metallic ends, and arranged perpendicularly to said base so as to extend from one cross conductor to another, and metallic caps fitting the ends of said plug and making electrical contact with said cross conductors 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,
CLARA J. CHRISTOFFEL.