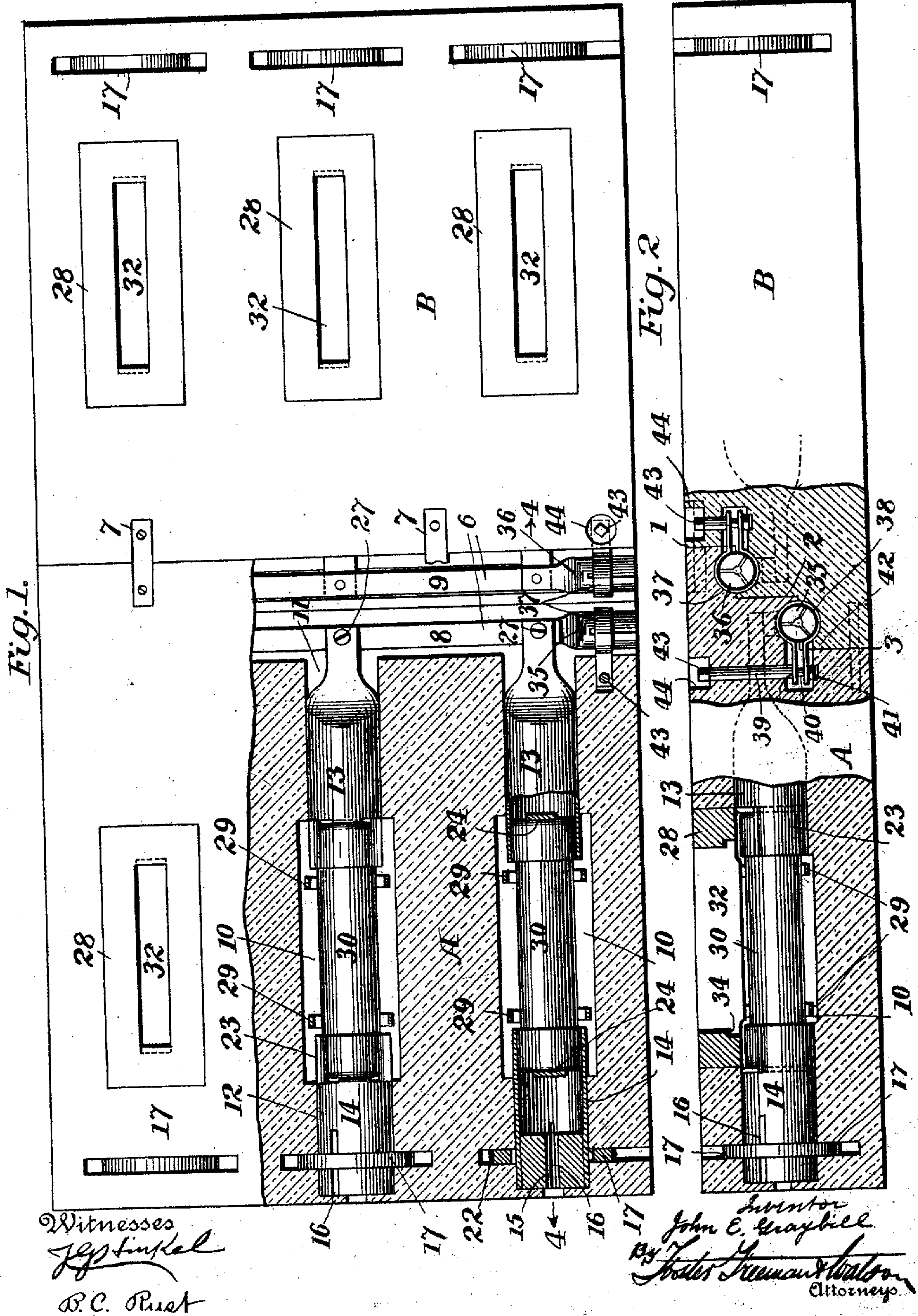


969,361.

J. E. GRAYBILL.
CIRCUIT PROTECTING APPARATUS.
APPLICATION FILED SEPT. 16, 1908.

Patented Sept. 6, 1910.

3 SHEETS—SHEET 1.

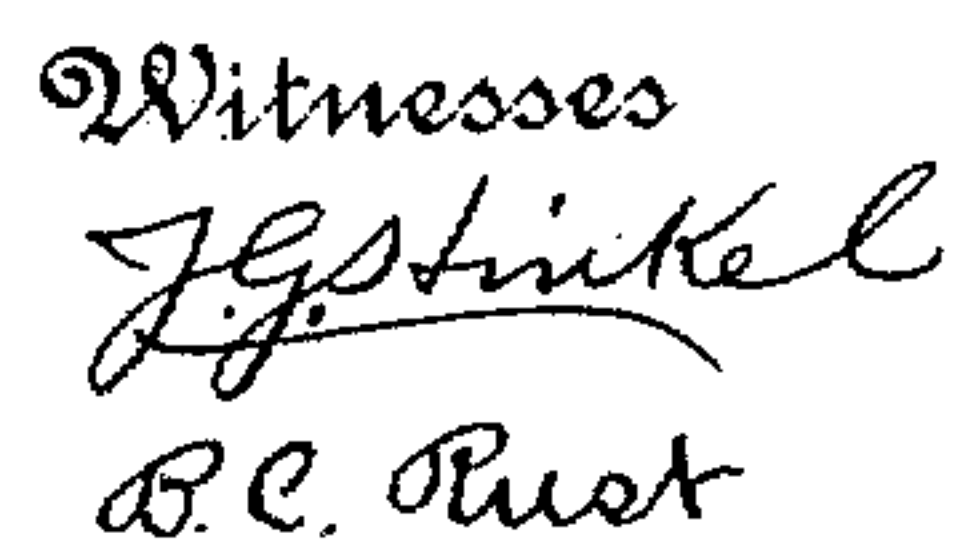


Witnesses
J. E. Graybill
B. C. Rust

Inventor
John E. Graybill
By *Frederick H. Watson*
Attorneys

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APPLICATION FILED SEPT. 15, 1906.

3 SHEETS--SHEET 2.



22 Inventor
John E. Graybill
By Hester Steward & Harton
Attorneys

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3 SHEETS—SHEET 3.

Fig. 9

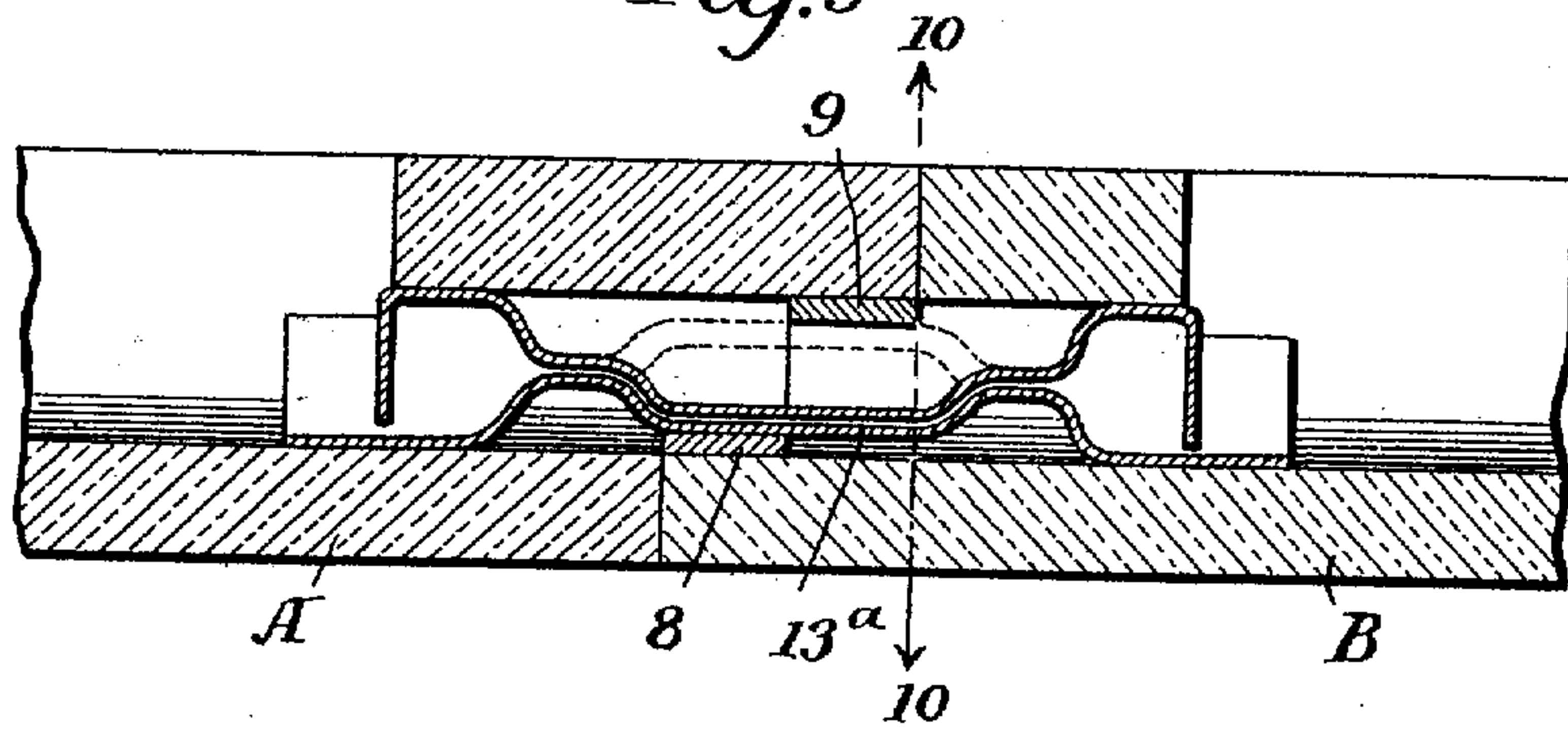


Fig. 10.

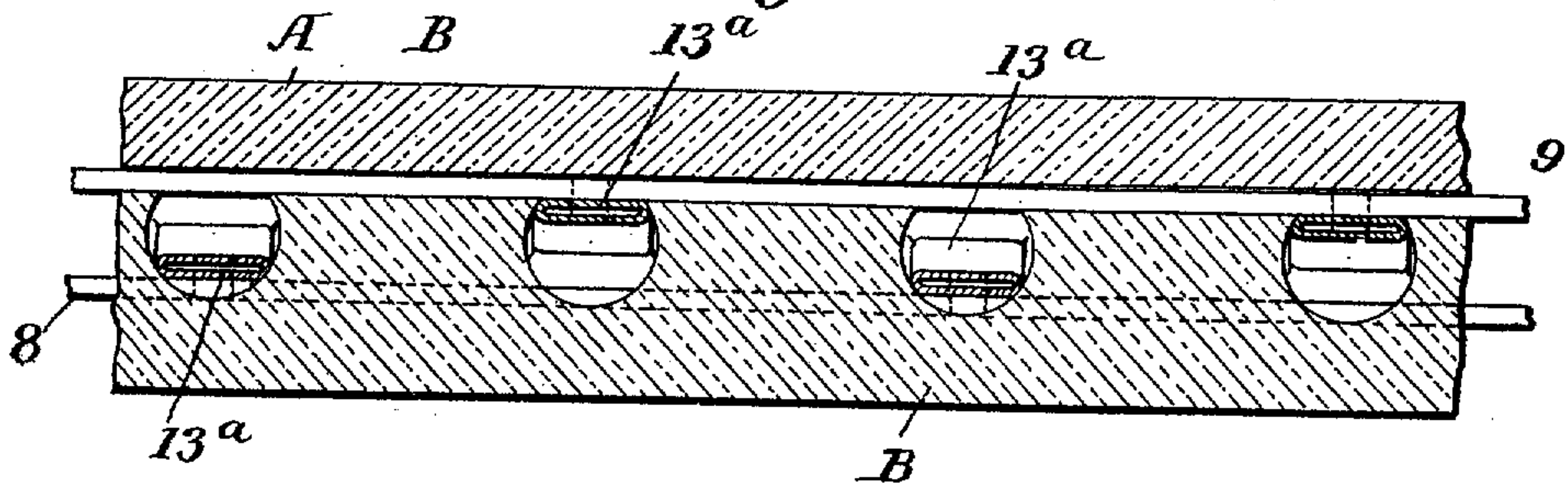
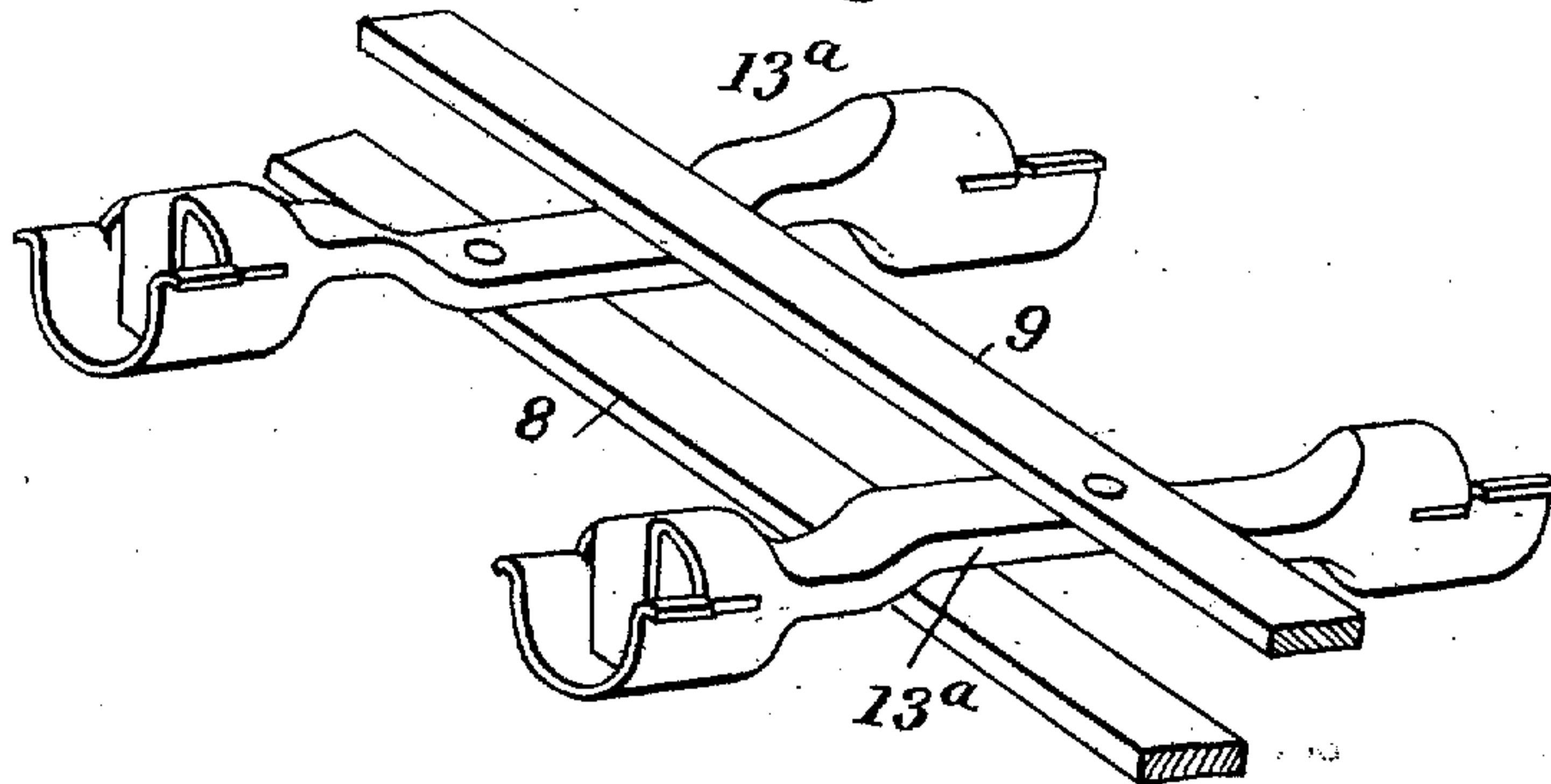


Fig. 11.



Witnesses
J. E. Graybill
J. J. McCarthy

Inventor
by John E. Graybill
Peter Freeman & Watson
Attorneys

UNITED STATES PATENT OFFICE.

JOHN E. GRAYBILL, OF YORK, PENNSYLVANIA.

CIRCUIT-PROTECTING APPARATUS.

969,361.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed September 15, 1906. Serial No. 334,762.

To all whom it may concern:

Be it known that I, JOHN E. GRAYBILL, a citizen of the United States, residing at York, York county, State of Pennsylvania, have invented certain new and useful Improvements in Circuit-Protecting Apparatus, of which the following is a specification.

This invention relates to the means whereby different conductors or circuits are connected together and which are known as tablet or junction boards. It has particular reference to apparatus of this class which provide means for the insertion of fuses.

One object of the invention is to provide a tablet board in which all the conducting parts shall be protected from exterior contact when the various portions are assembled.

A further object is to provide improved details as will be hereinafter set forth.

Referring to the accompanying drawings, which illustrate the invention, Figure 1 is a plan view of a tablet board partly broken away and partly in section; Fig. 2 is an end elevation of the board, partly broken away and partly in section; Fig. 3 is an elevation of a cover with a fuse secured thereto and also a means for removing the cover; Fig. 4 is a sectional view on the line 4—4 of Fig. 1, of one section of the board; Fig. 5 is a section on the line 5—5 of Fig. 4; Fig. 6 is a similar view looking in the opposite direction with the fuse and cover seated; Fig. 7 is a perspective view of a terminal; Fig. 8 is a section on the line 8—8 of Fig. 4; Fig. 9 is a sectional view through the portion of the block in which the bus bar chambers are formed and illustrating a slightly different form of bus bar terminal from that shown in the preceding figures; Fig. 10 is a view substantially on the line 10—10 of Fig. 9; Fig. 11 is a detail view of the form of bus bar terminal shown in Figs. 9 and 10.

In the structure illustrated, the board or block comprises two sections A and B of suitable insulating material such as porcelain, divided along the lines 1, 2, 3, 4 and 5 (see Figs. 2 and 4).

Each of the sections has a bus bar recess formed therein and when the two sections are assembled there are provided two bus bar chambers 6 each surrounded by the insulating material of the blocks, except for the openings or cavities for the terminals hereinafter referred to. The sections of the

block may be secured in coöperative relation in any suitable manner as by means of plates and screws 7. Inclosed within the chambers 6 are the bus bars 8 and 9, each, in the embodiment of the invention illustrated in Figs. 1 to 4, being connected to the terminals mounted in one section of the supporting board or block.

As the sections of the board or block are similar in construction, a description of one will apply to each. Each section has formed therein a plurality of fuse recesses 10 which communicate with the adjacent bus bar recess through cavities 11 in each of which is arranged a terminal 13 for connecting a fuse with a bus bar. A cavity 12 at the other end of each fuse recess 10 contains a terminal 14 for connecting a fuse with the wire of the exterior circuit or line. The terminal 14 has at one end a socket 15 adapted to receive a line wire. The walls of this socket are rendered collapsible by means of slots 16 and are constructed of elastic material such as phosphor-bronze so that they normally stand in released position. Means for collapsing the walls to grip a wire may consist of a washer 17 embracing the socket and having cam surfaces 18 engaging knobs 19 upon the socket walls, so that when the washer is turned in one direction the socket walls are collapsed and when turned in the other direction said walls are released. The washer may be turned by any suitable means, (as a tool 20 shown in dotted lines in Fig. 8) adapted to engage in a notch 21 in the washer and the notch is preferably so located that when the washer is in securing position, the notch will be concealed within the block. The exterior of the washer is shown as covered with insulating material 22 to prevent electrical connection with the terminal through the washer.

At the other end of the terminal 14 is a fuse seat 23 which projects into the fuse recess 10. The seat conforms to the contact portion of the fuse so that contact is made therewith throughout the length of the seat. The contact portion of the fuse is usually circular and is so illustrated. The seat therefor is in the arc of a circle and may be formed by cutting a tongue 24 from one side of a tubular portion of the terminal, the tongue being then bent inwardly to a substantially radial position. This forms a lateral opening 25 through which the fuse

has passage to and from its seat and the tongue contacts with the end of the fuse and thereby improves its connection with the terminal. The tongue preferably normally projects slightly into the path of the fuse and the lateral opening is somewhat less than the diameter of the fuse. As has been noted, the terminal is constructed of elastic material so that the edges of the seat yield to permit passage of the fuse and when the fuse is seated, the seat is spring pressed about it, thereby securely holding and making good contact with it. It will also be observed that the tongue will be spring pressed against the end of the fuse. To facilitate the passage of the fuse, the edges 26 of the seat may be beveled as shown.

The terminal 13 is formed from a piece of suitable tubing having one end constructed to form a fuse seat similar to that of the terminal 14 and its other end flattened out and connected by a screw or nut 27 to the bus bar.

The cover 28 for the recess 10 has secured to it a fuse, which may be of the inclosed type, by any suitable means as bands 29 which encircle the fuse and at their ends are secured to the cover. The bands may be made of spring material and shaped as shown in Fig. 6, so that upon lateral pressure upon them, the fuse may be withdrawn.

The fuse shown is of a well known inclosed type having an insulating casing 30 with metal caps or contacts at its ends to which is secured a fusible wire 31 which is inclosed by the casing.

An opening 32 in the cover permits observation of the fuse.

The fuse and cover are seated in the recess 10 by seating the fuse contacts in the fuse seats of the terminals 13, 14 which extend into the recess, the cover entering the recess with a snug fit and when seated being approximately flush with the exterior of the block.

For engagement with the cover to effect its removal, a bow 33 of spring metal may be provided. By pressing the ends of the bow together, they may be entered in the opening 32 to the proper extent and when released, the ends will enter recesses 34 in the cover.

To secure the line wires to the bus bars, terminals 35 and 36 may be located in cavities formed in the end walls of the bus bar chambers. Each of these terminals has at its outer end a collapsible socket similar to that described in connection with terminal 14, and the other end is adapted to be connected with a bus bar in any suitable manner. To control the collapsing of the socket of the terminal 35 or 36, a band 37 of spring material surrounds its walls. This band normally stands in released position and preferably insulation 38 is interposed between

the band and socket to prevent electrical contact between them. To actuate the band a rod 39 is mounted in the block and extends through the same so that it may be actuated from the exterior thereof. Preferably, the rod is rotatably mounted as shown. At its inner end, the rod 39 is turned down as at 40 to form a shoulder. This reduced portion is threaded to receive a nut 41 and passes through holes in the ends of the band 37 so that when in position the ends of the band are included between the shoulder and nut. Means for preventing turning of the nut, are provided so that upon turning the rod in one direction the ends of the band will be drawn together to collapse the socket, and upon turning it in the other direction, the ends of the bands are permitted to separate to release the socket. As shown the nut 41 extends into a seat in the supporting block so that it cannot turn. The other end 42 of the rod is made square or is otherwise adapted to be engaged by a turning means and is located within a countersunk recess 44 so that it does not project beyond the face of the block.

It is to be noted that the terminals 35 and 36 and their collapsing means are located wholly within the block so they are protected from injury and accidental contact.

Referring particularly to Figs. 9 to 11 in which a slight modification of the structure hereinbefore described is illustrated it will be seen that each of the bus bar chambers communicates with cavities or recesses in both sections of the block or board, although as previously described said chambers are completely separated from each other by the insulating material of which the block is composed when the sections are assembled. Each cavity also is insulated from every other cavity by the material forming the block. The bus bar terminals 13^a illustrated in these figures are each formed from a suitable tube which is provided at its ends with fuse seats similar to those heretofore described and is flattened or compressed at points between said seats to provide for its connection with the bus bar. As shown said terminals are arranged reversely that is the flattened sections of the terminal or set of terminals attached to the bar 8 extend over said bar while the terminal or set of terminals attached to the other bar 9 extend beneath said bar. By this arrangement the sections of the block are readily made of such form that when assembled they provide separate and independent chambers for the bus bars and also interpose a wall of insulating material between the several terminals.

While the invention has been illustrated in what is considered its best embodiment, the structure shown may be modified in various ways without departing from the spirit

of the invention. The invention should not therefore be limited to that structure.

Claims.

1. The combination with a block of insulating material having a fuse recess formed therein, of a fuse terminal at each end of said recess having a seat for a fuse provided with resilient side and end walls, the latter being connected with the body of the terminal at points between said side walls, substantially as set forth.

2. The combination with a block of insulating material having a fuse recess formed therein, of a fuse terminal at each end of said recess having a seat for a fuse and provided with a resilient tongue extending transversely of said seat with its free end adjacent the bottom of the seat, said tongue being adapted to contact with the end of a fuse supported by said seat, substantially as set forth.

3. The combination with a block of insulating material having a recess for a fuse formed therein, of a fuse terminal at each end of said recess, said terminals each comprising a tubular body cut away at one end to provide a seat for a fuse and having an integral resilient tongue extending into said seat from the outer edge of and between the sides thereof and adapted to contact with the end of a fuse supported by said seat, substantially as set forth.

4. The combination with a block of insulating material having a fuse recess formed therein and provided at its ends with terminals each having a seat for one end of a fuse, of a cover adapted to extend over said fuse recess, a fuse having its ends adapted to fit said seats in the terminals, and means detachably connecting the fuse to the lower face of the cover and including resilient bands attached to the cover and extending beneath the fuse and adapted to be released from the latter when subjected to lateral pressure.

5. The combination with a block of insulating material having a fuse recess formed therein and provided at its ends with terminals each having a seat for one end of a fuse, of a removable cover adapted to extend over said fuse recess, and provided with a slot having opposite walls thereof adapted for engagement with a suitable lifting device, and a fuse secured to the inner face of said cover and having its ends adapted to fit in the seats in said terminals when the cover is in position across the recess in the block.

6. The combination with a block having an inclosed bus bar chamber and cavities opening into said chamber, of a bus bar in said chamber, and terminals located in said cavities and connected to said bar, substantially as described.

7. The combination with a block having

an inclosed bus bar chamber and cavities opening into said chamber, of a bus bar in said chamber, a fuse terminal in one of said cavities, and a line terminal in another of said cavities, said terminals being connected to said bar, substantially as described. 70

8. The combination with a block having an inclosed bus bar chamber and being divisible through said chamber, and cavities opening into said chamber, of a bus bar in said chamber, a fuse terminal in one of said cavities, and a line terminal in another of said cavities, said terminals being connected to said bar, substantially as described. 75

9. The herein described tablet board or block comprising a plurality of sections of insulating material adapted when assembled to provide two bus bar chambers separated from each other by walls formed by said sections and terminal cavities communicating with said chambers, and means for connecting said block sections. 80 85

10. The herein described tablet board or block comprising a plurality of sections of insulating material adapted when assembled to provide two bus bar chambers extending parallel to each other and separated throughout their length by walls formed by said sections, each of said chambers communicating with terminal cavities formed in the block, and means for connecting said block sections. 90 95

11. The combination with a block comprising two sections, each section having formed therein a bus bar recess and a plurality of cavities opening into said recess, of terminals in said cavities of each section, and a bus bar connected to the terminals of each section, said sections when assembled forming two chambers each inclosing one of the bus bars, substantially as described. 100 105

12. The combination with a block comprising two sections, each having formed therein a bus bar recess and cavities opening into the said recess, of terminals in the cavities, a bus bar connected to the terminals of each block section, said sections when assembled forming independent chambers inclosing said bus bars, and line terminals mounted in the ends of said chambers, substantially as described. 110 115

13. The combination with a block having an inclosed bus bar chamber and cavities opening into said chamber, of a bus bar in said chamber, a fuse terminal in one of said cavities having at one end a seat adapted to contact with the sides and end of a fuse and having its other end connected with the bus bar, and a line terminal connected with the bus bar at one end and having its other end made tubular and extending into another of said cavities. 120 125

14. The herein described electric terminal having at one end a seat tubular in cross section and provided with a lateral opening, 130

through which a fuse may be introduced or withdrawn from said seat and at the other end a socket having collapsible walls, substantially as described.

5 15. The combination with a terminal having at one end a seat tubular in cross section, and provided with a lateral opening, and a tongue formed integral with the terminal and extending substantially radial of said opening, and at the other end a socket hav-
10 ing collapsible walls, of means surrounding and adapted to be adjusted for collapsing said walls, substantially as described.

15 16. The combination with a terminal comprising a socket having collapsible walls, of a band embracing said walls, and a rotatable rod connected with and adapted to tighten said band when rotated in one direc-
20 tion and to loosen said band when rotated in the other direction, substantially as described.

25 17. The combination with a block, of a terminal located therein, said terminal comprising a socket having collapsible walls, a band located within said block and embracing said socket and a rod extending to the exterior of the block and connected with the

band to tighten or loosen it, substantially as described.

18. The combination with a terminal com- 30
prising a socket having collapsible walls, of a band embracing said walls, and a rod connected with and adapted to tighten or loosen said band, substantially as described.

19. The combination with a block, of a 35
terminal located therein, said terminal comprising a socket having collapsible walls, a band located within said block and embracing said socket, and a rotatable rod extend-
40 ing to the exterior of said block and connected with and adapted to tighten or loosen said band according to the direction of rotation, substantially as described.

20. The herein described terminal formed from a tube having at each end means for 45
engaging a fuse and having its body flattened or compressed, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN E. GRAYBILL.

Witnesses:

ARTHUR L. BRYANT,
MILTON TIBBETTS.