

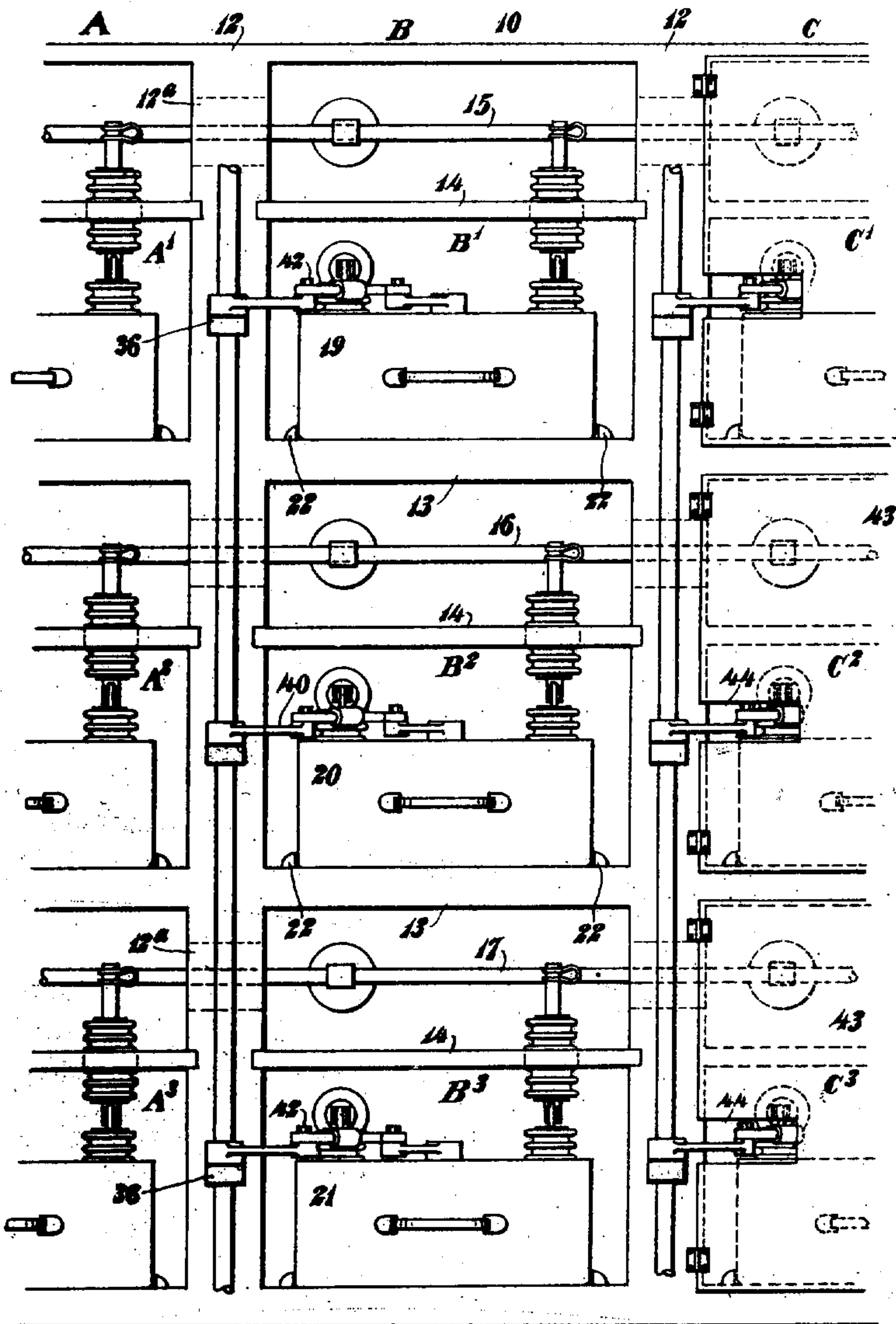
H. L. VAN VALKENBURG.
ARRANGEMENT OF PROTECTIVE APPARATUS.
APPLICATION FILED SEPT. 29, 1908.

899,358.

Patented Sept. 22, 1908.

2 SHEETS—SHEET 1.

Fig 1



Witnesses

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H. L. VAN VALKENBURG.
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 2 SHEETS—SHEET 2.

Fig 2

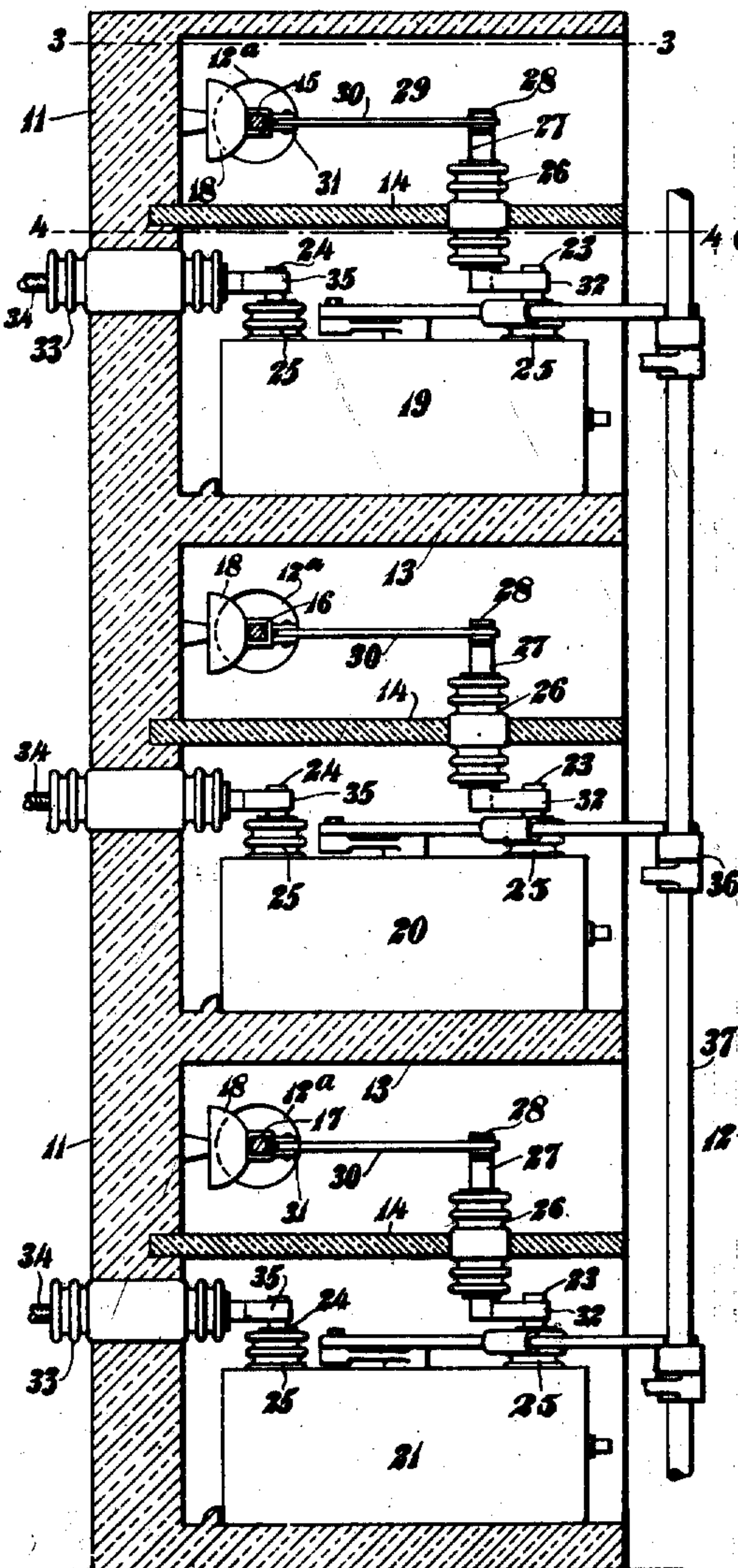


Fig 3

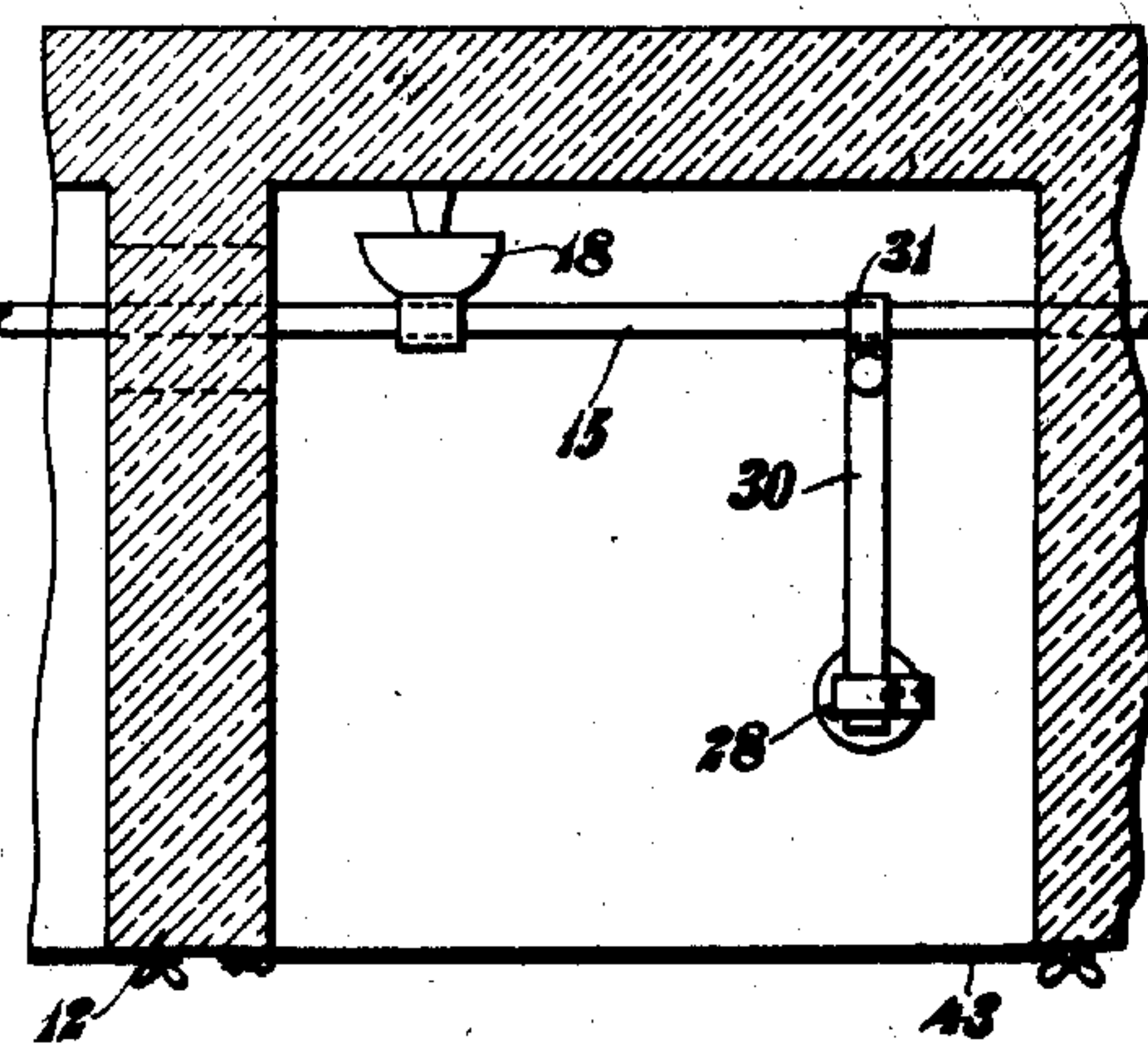
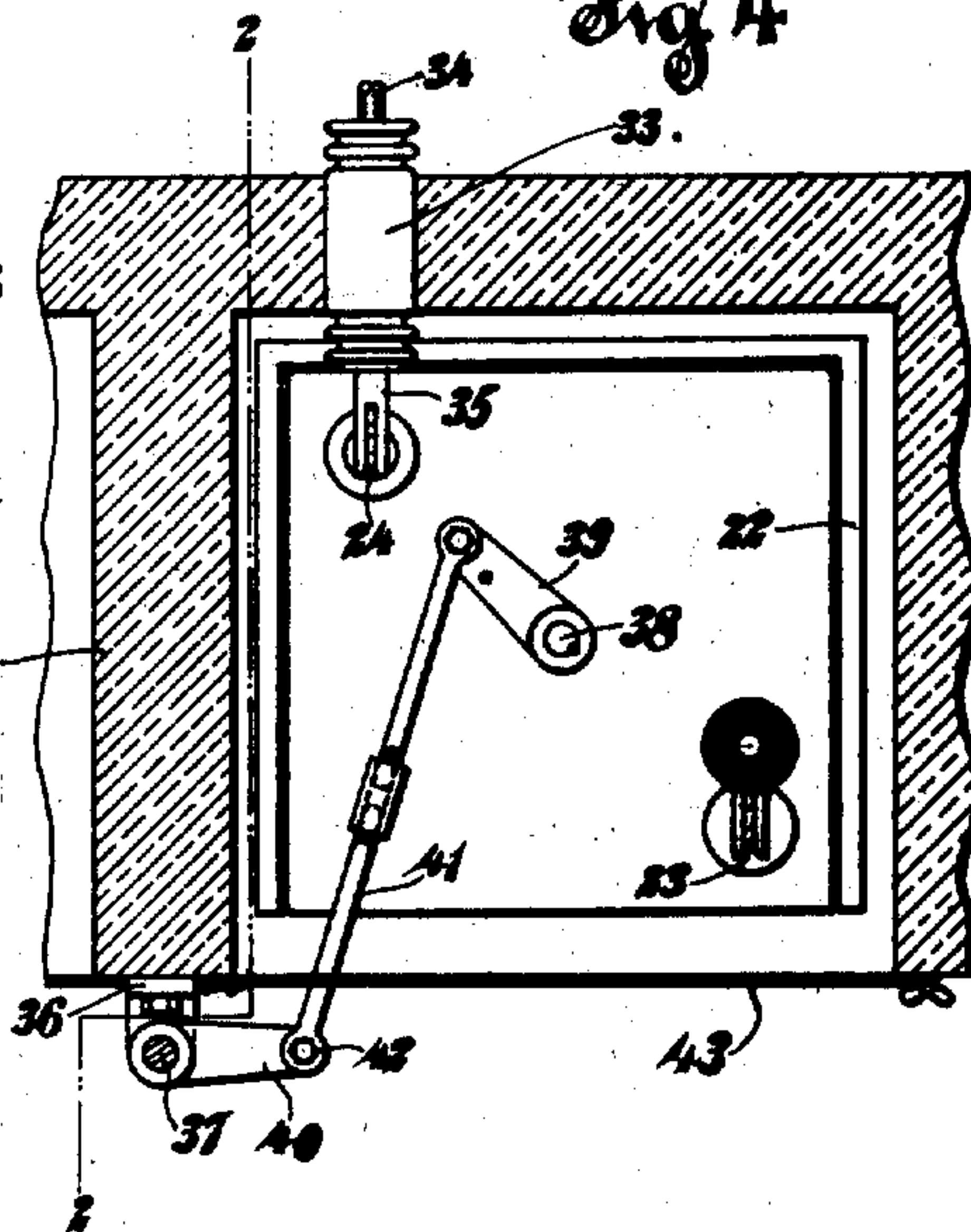


Fig 4



Witnesses

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UNITED STATES PATENT OFFICE.

HERMON L. VAN VALKENBURG, OF NORWOOD, OHIO, ASSIGNOR TO ALLIS-CHALMERS COMPANY, A CORPORATION OF NEW JERSEY, AND THE BULLOCK ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

ARRANGEMENT OF PROTECTIVE APPARATUS.

No. 899,358.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed September 29, 1906. Serial No. 336,669.

To all whom it may concern:

Be it known that I, HERMON L. VAN VALKENBURG, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Arrangements of Protective Apparatus, of which the following is a full, clear, and exact specification.

10 My invention relates to protective apparatus for systems of high voltage and large amperage and to its arrangement relative to the bus-bars in power stations or sub-stations.

15 One of the objects of my invention is to so arrange the different poles of multipole switching apparatus and the bus-bars that long cables and complicated connections between the switches and bus-bars are avoided and so that the switches can be easily connected to or disconnected from the bus-bars.

20 A further object is to place the switches and bus-bars in a simple, compact and safe arrangement so as to occupy a space as small as possible and as is consistent with safety.

25 A still further object of my invention is to so construct, inclose and arrange the switches and bus-bars that there is no danger of injury to the surrounding apparatus or to operator from arcs at the point or points of rupture, or danger of a short circuit between the different bus-bars.

30 My invention consists in the details of construction and in the combinations and arrangements of parts described in the specification and set forth in the appended claims.

For a better understanding of my invention reference is had to the accompanying drawings in which

40 Figure 1 is a front elevation of the switches, bus-bars and their compartments, parts being removed for the sake of clearness; Fig. 2 is a vertical section approximately along the line 2—2 of Fig. 4; Fig. 3 is a partial horizontal section along the line 3—3 of Fig. 2; and Fig. 4 is a partial horizontal section along the line 4—4 of Fig. 2.

45 Referring now to the figures of the drawings, I have shown at 10 an inclosure having a rear wall 11, and divided into main sections A, B and C by vertical walls 12. Each section is divided into three main compart-

ments A', A² and A³, B', B² and B³, etc., by horizontal walls 13 and each main compartment is again divided by horizontal walls or partitions 14 into two sub-compartments, the upper one of which is a bus-bar compartment and the lower one of which is a switch compartment. All the walls are made from non-conducting, fire-proof material, the walls 11, 12 and 13 being preferably made from cement or concrete and the horizontal walls or partitions 14 preferably consisting of slabs of slate or soapstone. There may be a greater number of vertical sections A, B etc. than are here shown, or there may be a less number, depending upon the number of auxiliary circuits connected to the bus-bars in the power station or sub-station. Also each vertical section may be divided into a greater number of compartments, depending upon the number of bus-bars or the number of phases in the main distributing circuit.

At 15, 16 and 17 are shown three bus-bars of a three-phase circuit extending horizontally through openings 12^a in the vertical walls 12 and through the bus-bar compartments of all the sections A, B, etc., being secured to the rear-wall by insulating supports 18. Each section of the inclosure contains a multipole oil switch, the poles being separated forming three separate single-pole oil switches 19, 20 and 21 which are located respectively in the three switch compartments, each single-pole switch resting on one of the horizontal walls 13. Thus the contacts of each pole are located in a separate oil tank which is isolated from the others and separated therefrom by fire-proof walls so that there can be no communication of an arc from one pole to another. The particular arrangement of the bus-bars and the single-pole switches effects a great saving in wiring and permits the switches of each phase to be readily attached to and disconnected from their respective bus-bars. In this case I provide means for readily removing the switches from the compartments when desired. As is shown in the drawings each of the tanks engages guides 22 on the floor of the compartment. Each switch is provided with two terminal rods 23 and 24 located in insulating bushings 25 extending outward

through the cover of the switch. Located in an insulating bushing 26 carried by each horizontal partition 14 above each switch is a bar 27 having its upper end in the bus-bar compartment and its lower end in the switch compartment. The upper end of the bar is provided with two laterally extending spring jaws 28 forming one member of a knife-blade bus-bar disconnecting switch 29, the other member of which is a bar or blade 30 pivoted to a clip 31 secured to the bus-bar. The lower end of the bar 27 is provided with two forwardly extending spring jaws 32 adapted to engage the upper end of terminal rod 23 of the switch. In the rear wall 11 and extending into each compartment is an insulating bushing 33 in which is mounted the conductor 34 of the auxiliary circuit adapted to be connected to the bus-bars. In this instance the end of the conductor 34 in the switch compartment is provided with two forwardly extending spring jaws 35 which engage the top of terminal rod 24. The spring jaws 32 and 35 are arranged in line with the ends of switch terminal rods 23 and 24 so that the switch can be connected to and disconnected from the end of conductor 34 and the bus-bar, by simply sliding the switch in and out of the compartment. Each tank is preferably provided with a handle to facilitate its insertion into the tank or its removal therefrom.

I have provided means whereby all the three single pole switches constituting the multiple switch for one auxiliary circuit can be simultaneously operated from a point remote from the switch. Located in front of the inclosure 10 and secured thereto by brackets 36 is a vertical rotary operating rod 37 for each group of single pole switches composing one of the three-phase switches. I have here shown switches of the rotary type each having a vertical spindle 38 adapted to be rotated to open and close the switch. At the top of each vertical spindle 38 is an arm or lever 39. Extending from the operating rod 37 opposite each switch compartment and in the same horizontal plane as the arm 39 on the spindle 38 is an arm 40. Connecting the arms 39 and 40 is a rod 41 consisting, in this case, of two short arms connected together by a sleeve so as to form a turn-buckle whereby the length of the rod 41 may be adjusted. The rod 41 and arm 40 on the operating rod are connected together in such a manner, preferably by a pin and nut 42, that the arm 40 and rod 41 can be easily disconnected when it is desired to remove the switch.

The switch and bus-bar compartments are adapted to be closed by a fire-proof door 43 hinged in this case to the front of the inclosure. Preferably each door covers the front of one bus-bar compartment and the corresponding switch compartment. Each

door is provided with a slot 44 through which the operating rod 41 passes. In Fig. 1 the doors are removed from sections A and B for the sake of clearness. The doors are also omitted from Fig. 2.

It is seen that with the arrangement of switches and bus-bars here shown a safe and compact structure is obtained, and the usual complicated wiring between the switches and bus-bars is avoided. Furthermore the single pole switches can be easily connected to or disconnected from the bus-bars, and can be removed from the compartments without difficulty.

I do not wish to be confined to the exact details shown but aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of my invention.

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

1. In combination, a multipole switch, a fire-proof inclosure therefor, each pole of said switch being located in a separate compartment, and a plurality of bus-bars passing through said inclosure, each bus-bar being located adjacent one pole of said switch.

2. In combination, a multipole switch comprising a plurality of single pole switches, and a plurality of bus-bars, said bus-bars and switches being alternately arranged in vertical alinement.

3. In combination, a fire-proof inclosure comprising a plurality of bus-bar and switch compartments alternately arranged in vertical alinement, bus-bars passing through said bus-bar compartments, and switches located in said switch compartments and connected to the bus-bars.

4. In combination, a fire-proof inclosure comprising a plurality of compartments, bus-bars and switches alternately arranged in vertical alinement in said compartments and disconnecting switches in said bus-bar compartments.

5. In combination, a fire-proof inclosure consisting of a plurality of adjacent sections, each section consisting of a plurality of bus-bar and switch compartments alternately arranged one vertically above the other, a plurality of horizontal bus-bars passing through the bus-bar compartments of all of said sections, and a plurality of multipole switches each consisting of a plurality of single pole switches arranged respectively in the switch compartments of one of said sections.

6. In combination, a fire-proof inclosure consisting of a plurality of adjacent sections, each section consisting of a plurality of bus-bar and switch compartments alternately arranged, one vertically above the other, a plurality of horizontal bus-bars passing through the bus-bar compartments of all of said sections, a plurality of multipole switches each consisting of a plurality of single pole

switches arranged in the switch compartments of one of said sections, and means for simultaneously operating all the switches of one section.

5 7. In combination, a fire-proof inclosure comprising a plurality of compartments, a plurality of bus-bars and oil switches arranged alternately in said compartments, a conductor of an auxiliary circuit extending
10 outward from each switch compartment, and a second conductor also extending from each switch compartment into the adjacent bus-bar compartment.

15 8. In combination, a fire-proof inclosure comprising a plurality of compartments arranged one vertically above the other, a plurality of bus-bars and oil switches arranged alternately in said compartments, a conductor of an auxiliary circuit extending outward
20 from each switch compartment, and a second conductor also extending from each switch compartment into the adjacent bus-bar compartment, each oil switch having terminal

rods adapted to be connected to said conductors.

25

9. In combination, a fire-proof inclosure comprising a plurality of compartments, a plurality of bus-bars and removable oil switches arranged alternately in said compartments, a conductor of an auxiliary circuit extending outward from each switch
30 compartment, and a second conductor also extending from each switch compartment into the adjacent bus-bar compartment, each oil switch having terminal rods adapted to be connected to or disconnected from said conductors when the switches are inserted
respectively.

In testimony whereof I affix my signature, 40
in the presence of two witnesses.

HERMON L. VAN VALKENBURG

Witnesses:

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FRED. J. KINSEY.