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Patented Aug. 3, 1909.

4 SHEETS—SHEET 1.



Olive & Harman  
Fred J. Kinsey

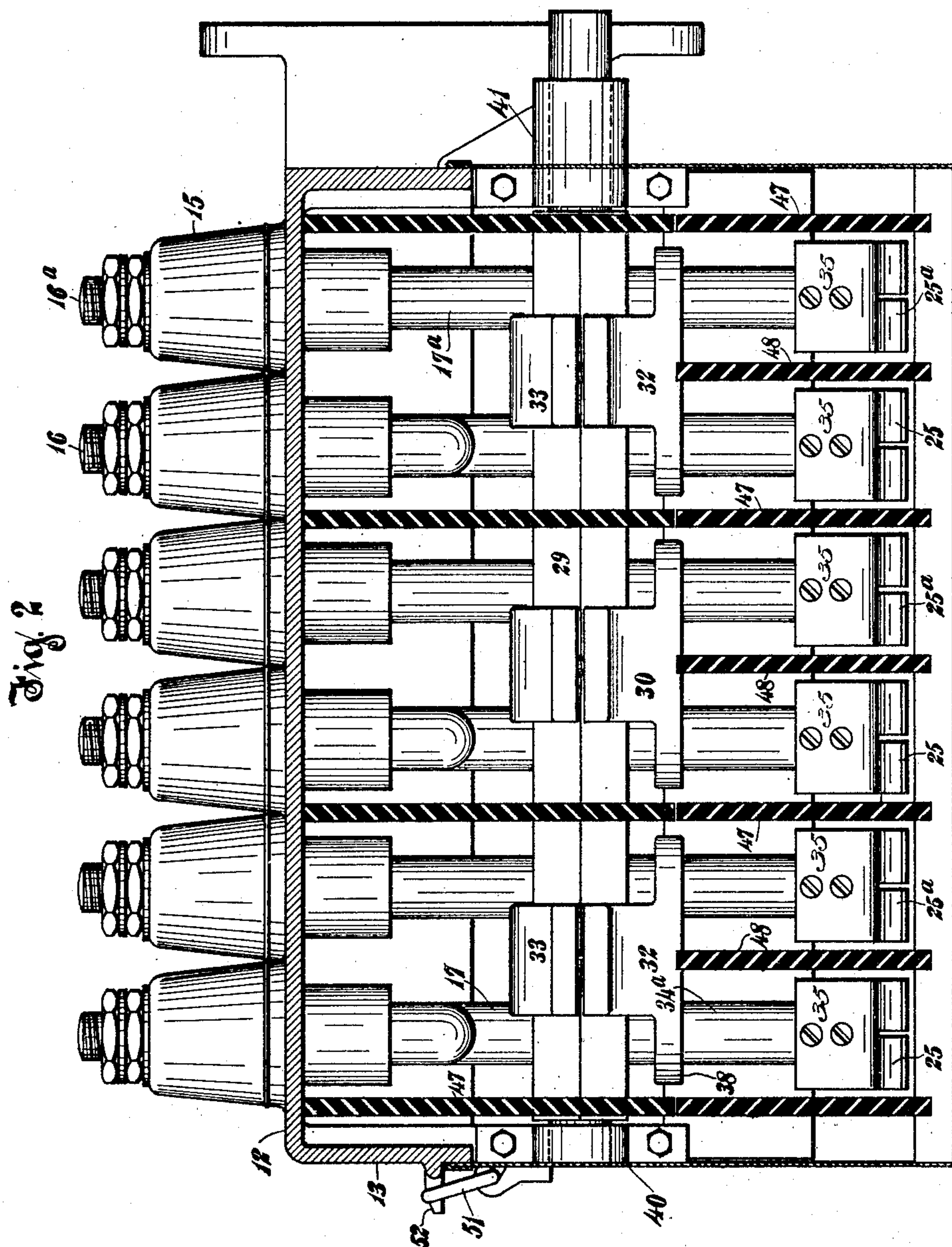
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4 SHEETS—SHEET 2.



Witnesses

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CIRCUIT BREAKER.  
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4 SHEETS—SHEET 3.

Fig. 4.

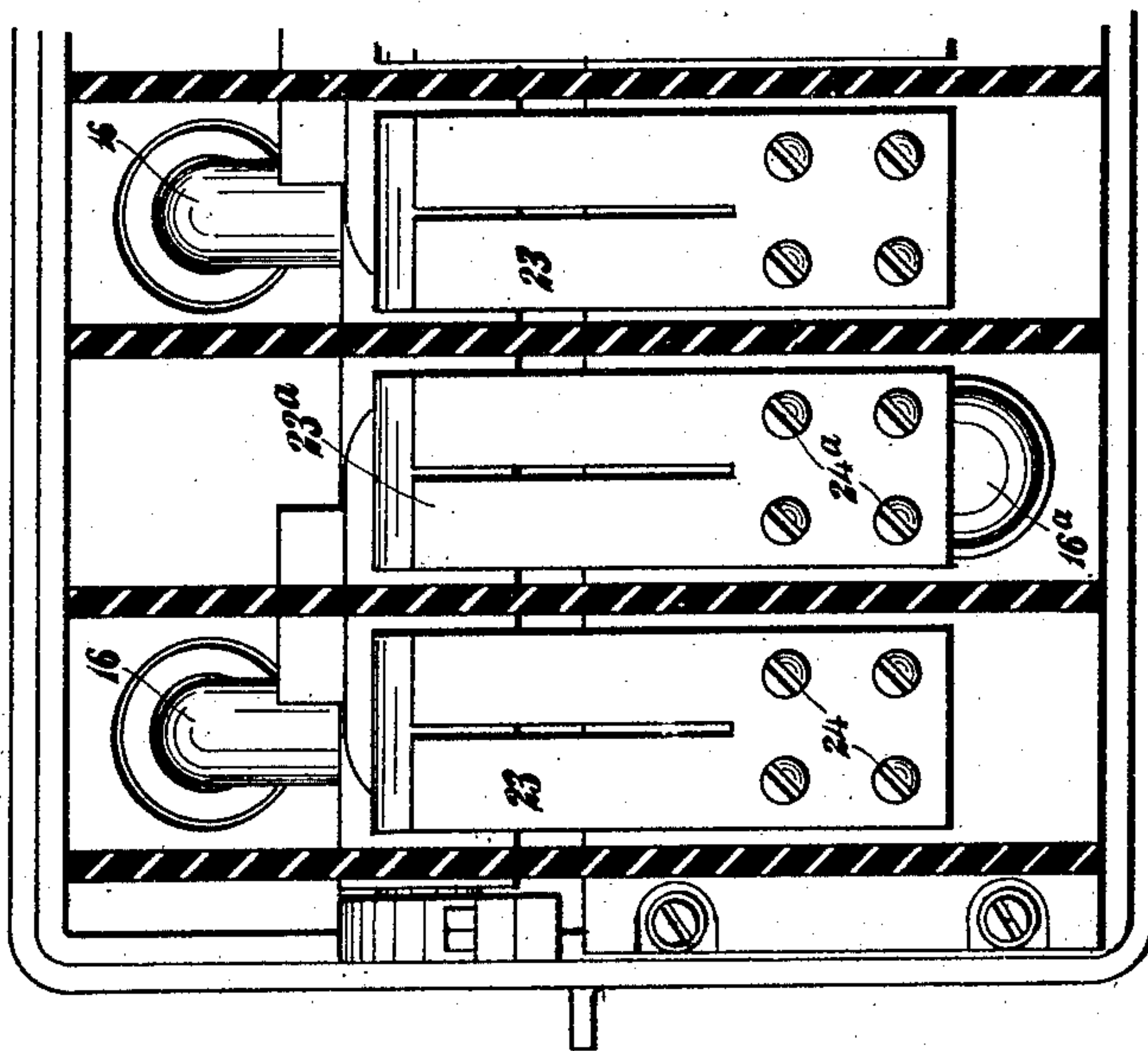
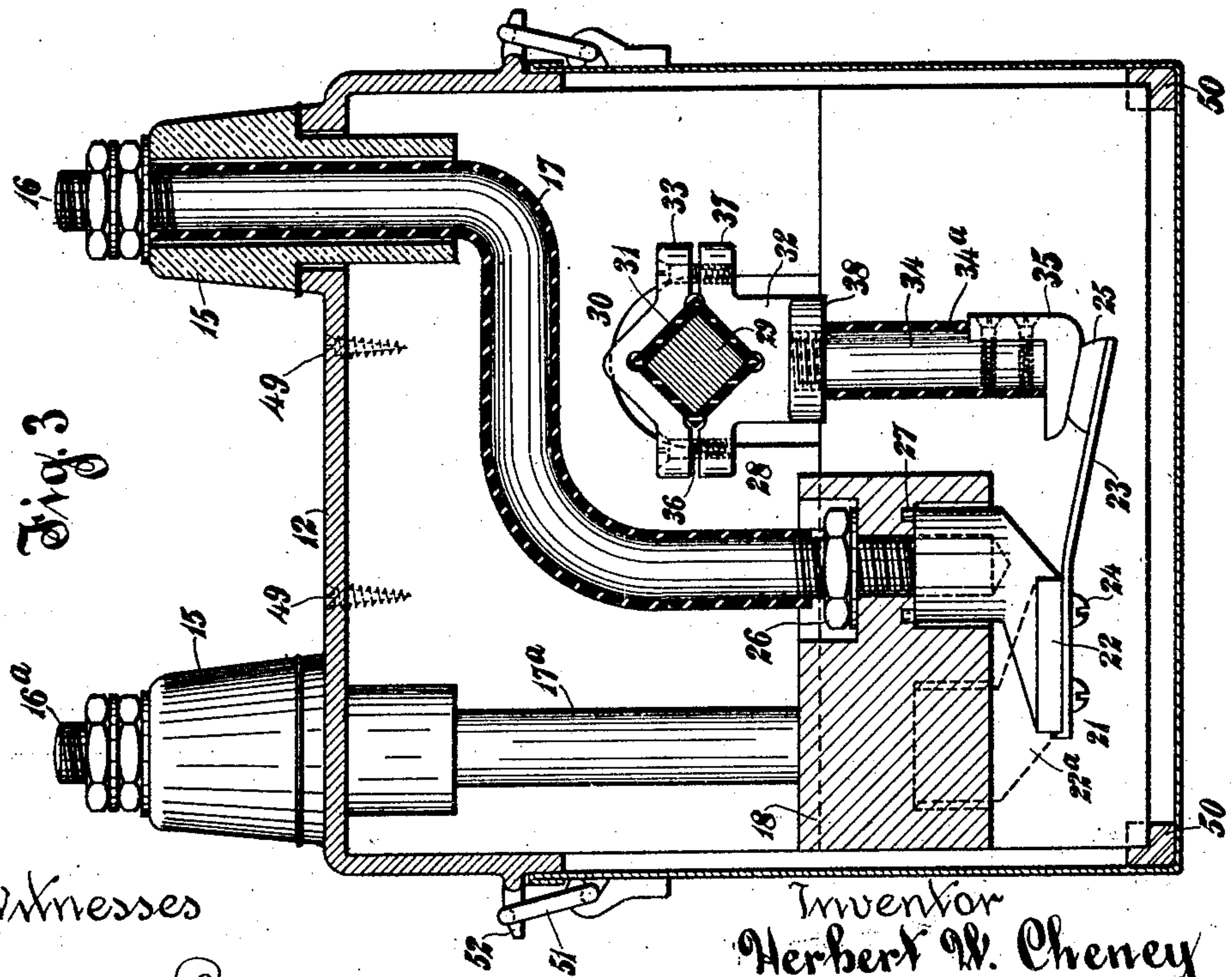


Fig. 3



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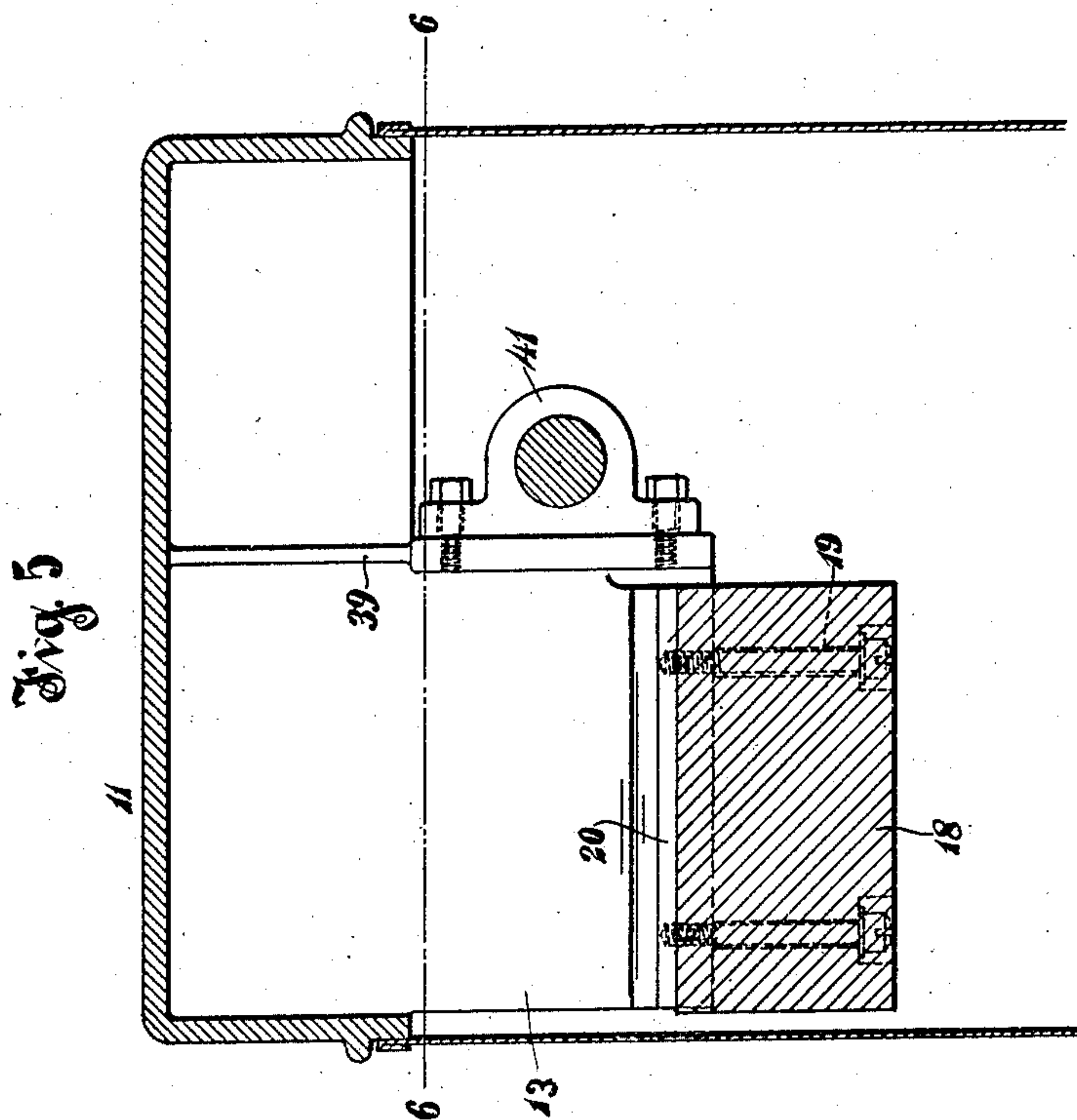
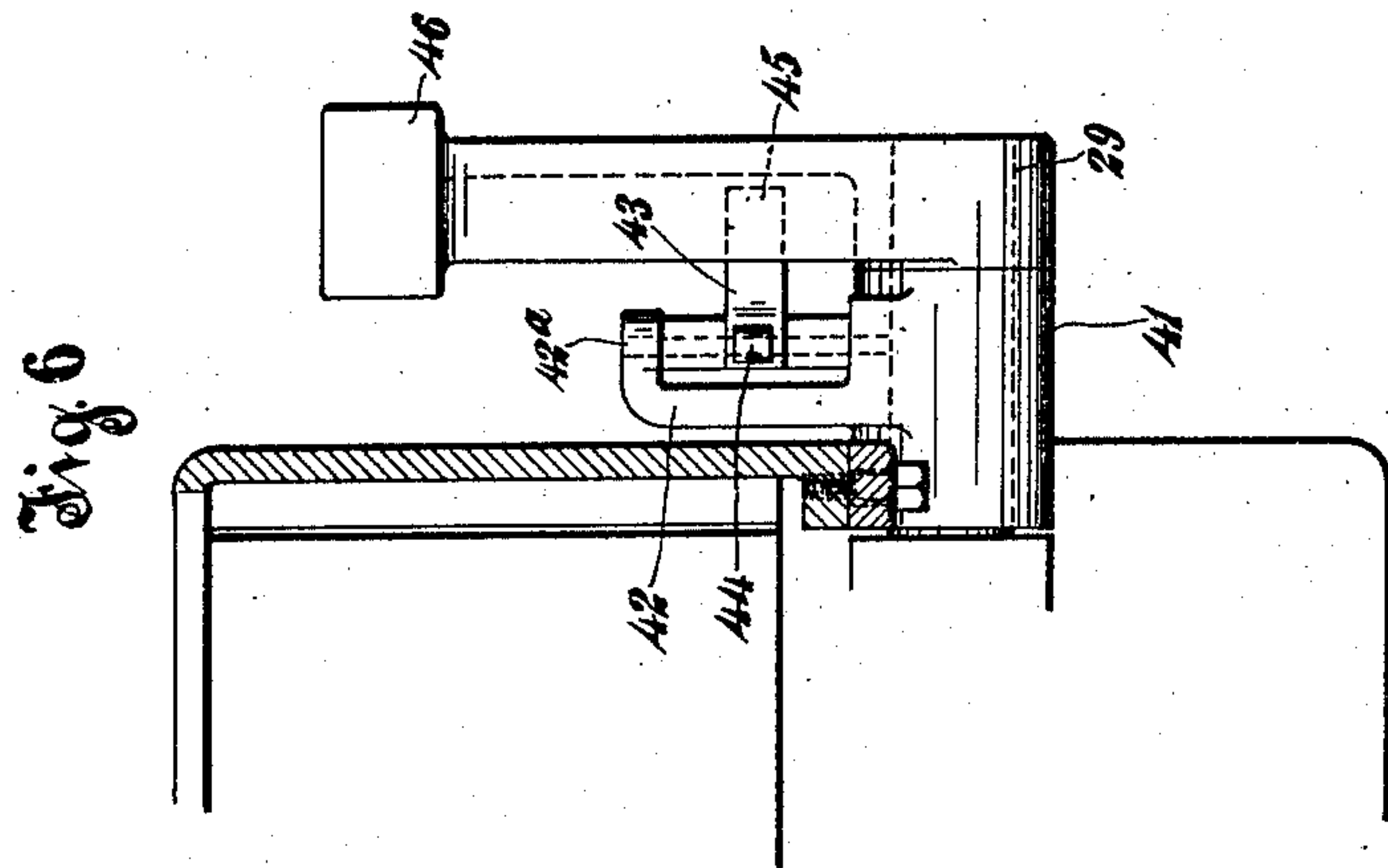
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# UNITED STATES PATENT OFFICE.

HERBERT W. CHENEY, OF NORWOOD, OHIO, ASSIGNOR TO ALLIS-CHALMERS COMPANY, A CORPORATION OF NEW JERSEY, AND THE BULLOCK ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

## CIRCUIT-BREAKER.

No. 930,155.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed October 22, 1906. Serial No. 339,907.

*To all whom it may concern:*

Be it known that I, HERBERT W. CHENEY, 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 Circuit-Breakers, of which the following is a full, clear, and exact specification.

My invention relates to oil switches or circuit-breakers.

One of the objects of my invention is to provide a switch which is compact, simple in construction, and suitable for circuits of high voltage and large amperage.

A further object is to provide a switch of such construction that the contact members can be easily removed in case repairs are necessary.

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

Figure 1 is a longitudinal section of the switch showing the same attached to the switch-board; Fig. 2 is a similar view of the switch taken from the opposite side to that shown in Fig. 1; Fig. 3 is a transverse section; Fig. 4 is a partial bottom view showing the arrangements of the contacts; Fig. 5 is a partial horizontal sectional view of the switch showing a portion of the switch operating mechanism, the section being taken approximately along the line 5—5 of Fig. 1 looking in the direction of the arrows; and Fig. 6 is a horizontal section approximately along the line 6—6 of Fig. 5.

Referring now to the figures of the drawing, 10 represents a switch panel, to the rear of which the switch is attached. The switch is provided with a supporting frame or casting 11 consisting of a horizontal portion 12 and downwardly extending side and end portions 13. The casting is provided with forwardly extending lugs or brackets 14 through which bolts 14<sup>a</sup> pass which secure the switch to the switch panel.

I have here shown a three-pole switch but it is to be understood that my switch is not limited to a switch of this specific number of poles. The horizontal portion of the frame or casting is provided in this case with three pairs of terminal openings which are staggered and arranged alternately adjacent the opposite sides of the frame or casting. Located in the terminal openings are porcelain

bushings 15 adapted to receive terminal rods 16 and 16<sup>a</sup> surrounded by insulating sleeves 17 and 17<sup>a</sup>. It will be seen that there are for each pole one terminal rod 16 and one terminal rod 16<sup>a</sup> located on opposite sides of the switch.

At 18 is shown a bar made of some insulating material such as wood, which bar supports in this case three pairs of stationary switch contacts. The bar extends longitudinally of the switch at right angles to the switch panel, being secured at its ends by screws 19 to projections or ridges 20 on the downwardly extending portions 13 of the switch casting 11. The terminal rods 16<sup>a</sup> extend straight down from the bushings through the bar 18, and the terminal rods 16 are bent or curved toward the terminal rods 16<sup>a</sup> and likewise pass through the bar 18. The openings in the bar 18 for the terminal rods 16 are out of alinement with the openings for the terminal rods 16<sup>a</sup>. With this arrangement greater leakage surface is provided between the live parts of each pole than would be provided if all the terminal rods were in alinement at the bar 18. Connected to the lower ends of terminal rods 16 are contact members 21 each consisting of a contact base 22, a spring contact finger 23 secured thereto by one or more screws 24, and a contact tip or face 25 secured to the end of the contact finger. Connected to the lower ends of the terminal rods 16<sup>a</sup> are contact members 21<sup>a</sup> each consisting of a contact base 22<sup>a</sup>, a spring contact finger 23<sup>a</sup> secured thereto by one or more screws 24<sup>a</sup>, and a contact face or tip 25<sup>a</sup> secured to the outer end of the contact finger. The lower ends of the contact bases 22 and 22<sup>a</sup> extend toward each other and the lower faces to which the spring contact fingers 23 and 23<sup>a</sup> are secured are in alinement with one another. The contact fingers 23 and 23<sup>a</sup> are of the same length so that the contact tips 25 and 25<sup>a</sup> are also in alinement with one another. Each contact rod is provided with a nut 26 located in a recess in the top of the bar for drawing the contact bases tightly against the lower face of the supporting bar. Preferably the upper ends of the contact bases are located in recesses in the lower face of the bar and are prevented from turning by one or more dowel-pins 27.

At 28 is shown a rotary switch member



consisting of a spindle 29 and three U-shaped bridging contact members 30, (see Figs. 2 and 3) which are clamped to the spindle 29, insulation 31 being interposed between the contact members and the spindle. The portion of the spindle to which the bridging contact members are clamped is preferably polygonal in cross-section so that the contact members can not turn relative to the spindle. Each bridging contact member consists of a lower casting 32, an upper cap 33, a pair of downwardly extending contact rods 34 and contacts 35 secured to the lower ends of the contact rods. The casting 32 and cap 33 are each provided with a recessed portion to receive the spindle 29 and are clamped thereto by screws 36 passing through perforated ears 37. Each casting 32 is also provided on each side with a projection 38 below the shaft, in which the upper ends of the contact rods 34 are secured. The contact rods 34 are surrounded by insulating sleeves 34<sup>a</sup> which prevent the arcs from traveling upward on the rods when the switch is opened.

It is seen that the rotary switch member is located at one side of all the contact rods 16 and 16<sup>a</sup>. I so mount the rotary switch member that it can be easily removed from the switch after the tank has been removed. In this case the downwardly extending end portions of the casting 12 are each provided with a rib 39 which is preferably faced off on the side opposite the contact rods. Bolted to the side of this rib or ridge 39 are the two bearings 40 and 41 for the rotary spindle. The bearing 41 extends outward toward the switch-board and is provided beyond the tank with a lug 42 having at its outer end a projection 42<sup>a</sup> which extends at right angles to the switch-board. A bell-crank lever 43 is mounted on a pin or spindle between the bearing 41 and projections 42<sup>a</sup>. The bell-crank lever is provided with an upwardly extending arm 44 and with an arm 45 which engages a weighted lever 46 which is secured to the outer end of the spindle 29. The bell-crank lever is adapted to be operated either manually or automatically by any suitable mechanism. The operating mechanism forms no part of the present invention and further description and illustration are thought to be unnecessary. Thus it is seen, that to remove the rotary switch member and the parts carried thereby, all that is necessary is to first remove the oil tank and then loosen the bolts which secure the bearings 40 and 41 to the casting.

Each pole of the switch is separated from the adjacent pole and from the ends of the oil tank by vertical insulating barriers 47, and the contacts of each pole are further separated from each other by short vertical barriers 48. The barriers 47 are preferably secured to the upper part of the casting 12 by screws 49, each of the barriers having a re-

cessed portion which receives spindle 29. The barriers 48 are provided with notched portions which fit closely around the insulating bar 18 and are preferably carried by bars or rods 50 in the bottom of the tank so as to be removable with the tank.

The oil tank is supported by hooks or rings 51 which engage lugs or projections 52 on the casting. The end of the tank adjacent the switch-board is provided with a recessed portion which receives the projecting portion of the bearing 41.

It is seen that I have provided a switch which is simple in construction, compact, and so arranged that all the parts can be easily removed in case repairs are necessary. There is no danger of communication of an arc from one pole to another or leakage between the different parts of the same pole. Furthermore the particular arrangement of the poles of the switch permits a switch of any number of poles to be attached to a narrow switch-board panel.

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 a switch or circuit-breaker, a frame or casting, a set of terminal rods extending through said frame or casting, an insulating support, stationary contact members carried thereby and arranged in a line, a movable switch member, a contact member carried thereby and adapted to engage the said stationary contact members, said terminal rods entering said insulating bar at points out of line with each other so that a long leakage surface is provided.

2. In a multipole switch or circuit-breaker, a frame or casting, an insulating support, a plurality of sets of stationary contacts carried thereby, said contacts being arranged in a line, a plurality of contact rods connected to said contacts, said rods passing through both said insulating support and frame or casting at points which are staggered or out of alinement so that long leakage surfaces are provided.

3. In an oil switch or circuit-breaker, a frame or casting having downwardly extending sides, movable and stationary insulating supports mounted in said downwardly extending sides, contacts carried by said supports, the contacts of each of said supports being arranged in a line, terminal rods connected to the stationary contacts and passing through both said stationary insulating support and frame or casting at points which are staggered out of line with one another.

4. In combination, a switch panel, an oil switch on the rear side thereof, said switch comprising a frame secured to the panel and



having an upper horizontal portion and downwardly extending side portions, an oil receptacle detachably secured to said frame, the horizontal portion of the latter forming a cover for the receptacle, a movable switch member comprising an oscillatory drum mounted in the downwardly extending side portions of the frame at right-angles to the panel, one end of the drum extending beyond the receptacle, a plurality of contacts secured to said drum and extending downward therefrom, a stationary switch member comprising a bar secured to the downwardly extending side portions of the frame and located below and at one side of the drum, a plurality of contacts carried by said bar and extending laterally therefrom below the drum in a position to be engaged by the contacts on the drum, and terminal conductors connected to the last named contacts and extending upwardly through the horizontal portion of the frame.

5. In combination, a switch panel, an oil switch on the rear side thereof, said switch comprising a frame secured to the panel and having an upper horizontal portion and downwardly extending side portions, an oil receptacle detachably secured to said frame, the horizontal portion of the latter forming a cover for the receptacle, a movable switch member comprising an oscillatory drum mounted in the downwardly extending side portions of the frame at right-angles to the panel, one end of the drum extending beyond the receptacle, a plurality of bridging contact members carried by the drum, each of said members comprising a pair of downwardly extending contact arms or rods having contacts at their free ends, a stationary switch member comprising an insulating bar secured to the downwardly extending side portions of the frame and located below and at one side of the drum, a plurality of pairs of contact members carried by said bar, said members having contact fingers extending laterally, the free ends of said fingers having contact adapted to be engaged by the contacts of the bridging contact members, and terminal conductors connected to the stationary contact members and passing up-

wardly through the horizontal portion of the frame.

6. In an oil switch, a frame, an oil tank secured to the frame, a plurality of stationary contacts supported within the tank, an oscillatory switch member comprising a drum journaled in the frame, a plurality of bridging contact members secured to the drum, each bridging contact member comprising two parts surrounding the drum, said parts having outwardly extending ears, screws passing through said ears and clamping said parts to the drum, a pair of contact arms or rods secured to one of said parts, said contact arms or rods having at their free ends contacts adapted to engage the stationary contacts.

7. In a switch or circuit breaker, a frame, a plurality of terminal conductors extending through said frame adjacent opposite sides of the latter, an insulating supporting member secured to said frame, said terminal conductors passing through said member at points which are staggered or out of line, so as to provide long leakage surfaces between said terminal conductors, contacts at the lower ends of said conductors having contact fingers arranged in a line, and an oscillatory switch member arranged at one side of said supporting member, said oscillatory switch member having bridging contacts adapted to engage the contact fingers.

8. In a switch or circuit-breaker, a frame or casting, a plurality of stationary contacts, terminal conductors connected thereto, an oscillatory switch member comprising a support journaled in said frame and having bridging contacts adapted to engage the stationary contacts, each of said bridging contacts comprising a pair of members clamped together about said support and a pair of downwardly extending members secured to one of said members clamped about the support.

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

HERBERT W. CHENEY.

Witnesses:

ARTHUR F. KWIS,  
FRED J. KINSEY.