

H. W. CHENEY.

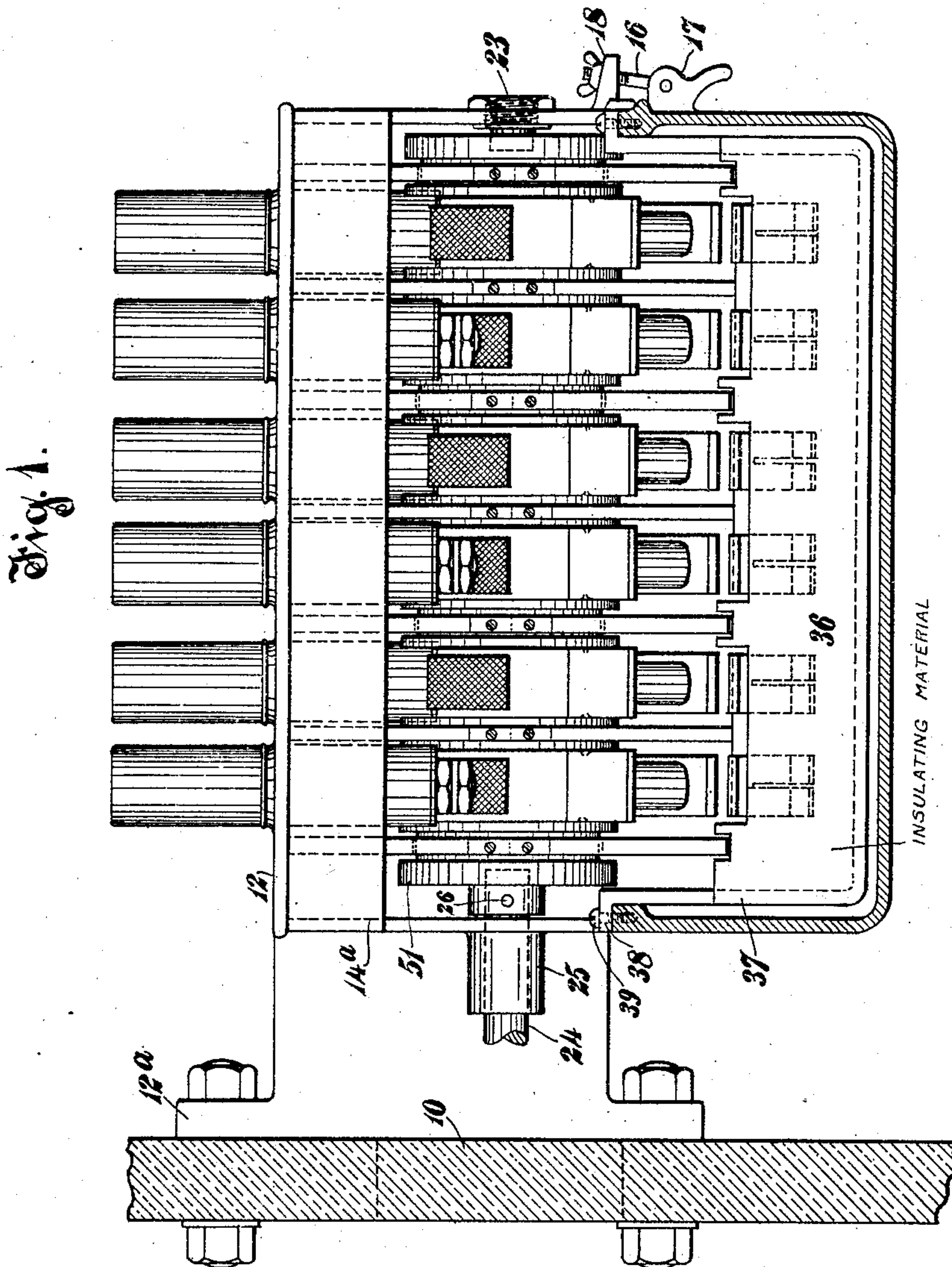
OIL SWITCH.

APPLICATION FILED OCT. 22, 1906.

930,156.

Patented Aug. 3, 1909.

2 SHEETS—SHEET 1.



Witnesses

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By

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Fig. 3

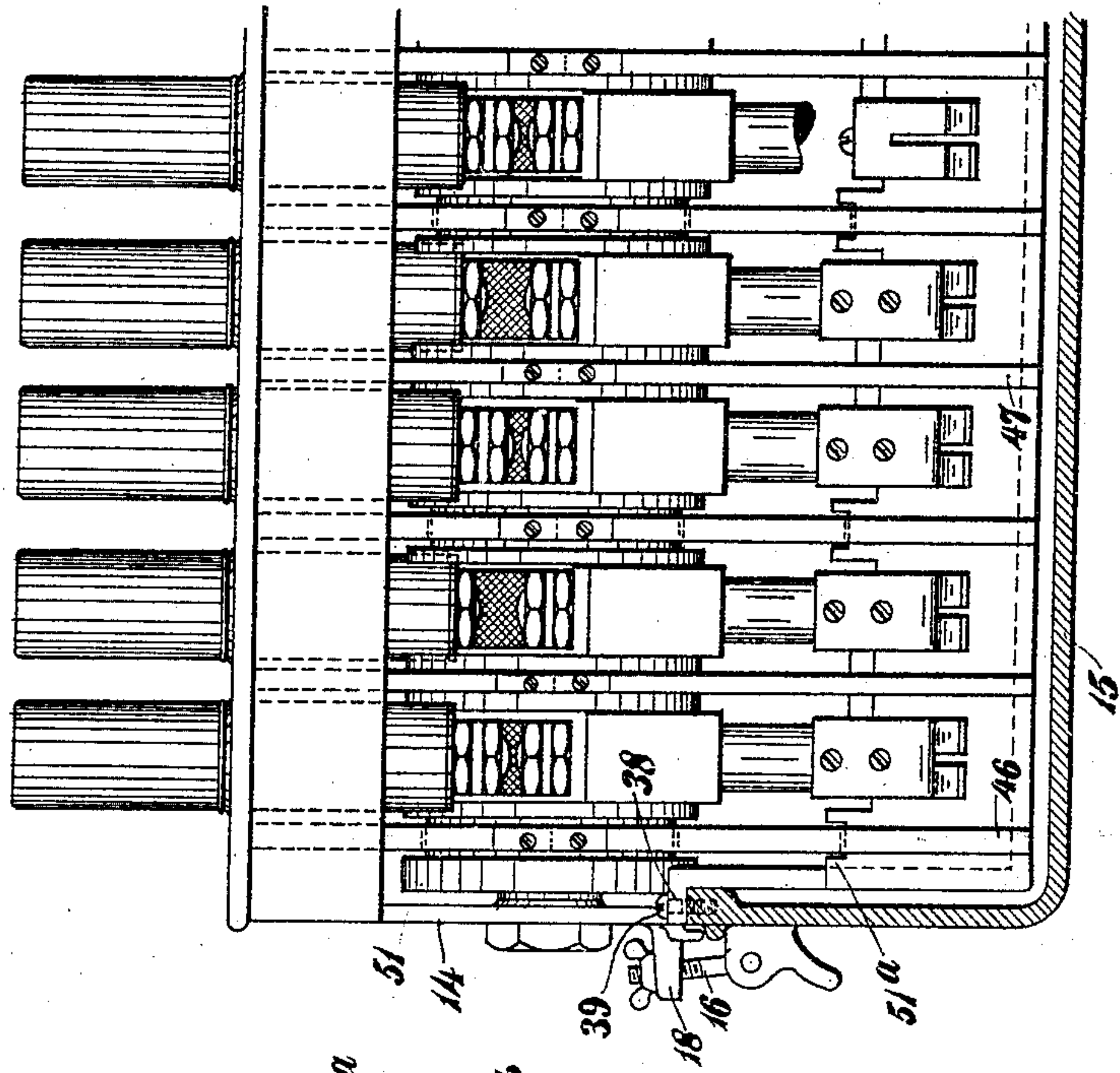
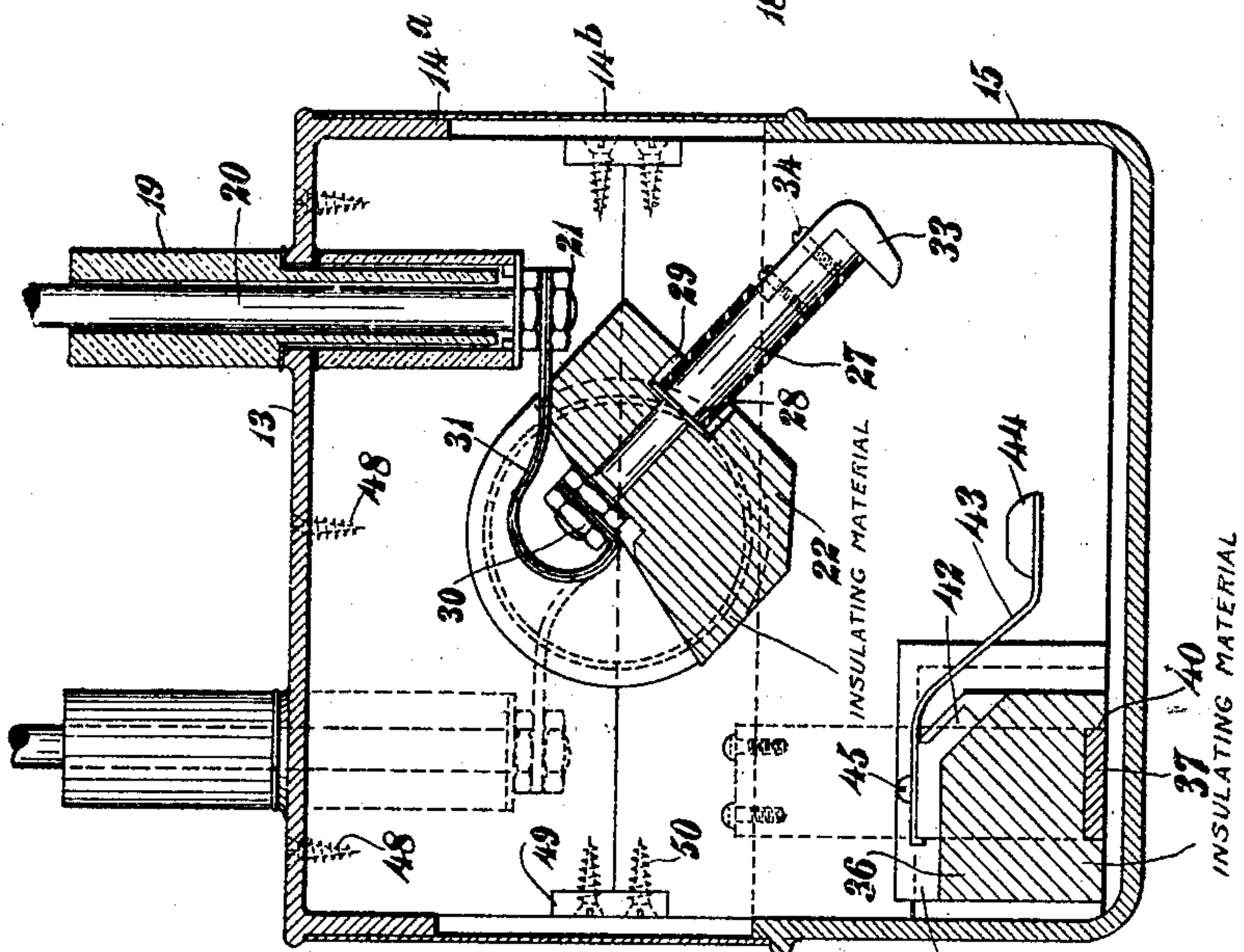


Fig. 2



Witnesses

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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.

## OIL-SWITCH.

No. 930,156.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed October 22, 1906. Serial No. 339,908.

*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 Oil-Switches, 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 for circuits of high voltage and large amperage, a switch simple in construction and effective in operation.

A further object is to provide for a system of any number of phases a switch which can be readily attached to a narrow switch-board panel.

My invention consists in the details of construction and 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—

Figure 1 is a sectional elevation of the switch showing the same attached to a switch-board panel, the operating mechanism not being shown; Fig. 2 is a transverse section of the same showing the switch in the open position; and Fig. 3 is a partial sectional elevation, the view being taken from the opposite side to that shown in Fig. 1.

Referring now to the figures of the drawings, I have shown at 10 a switch-board panel on the rear of which the oil switch is mounted. I have here shown a three pole switch for a three phase circuit, but my invention is not limited to a switch of this specific number of poles. The switch is provided with an upper horizontal frame or casting 12 which supports the switch elements and forms a covering for the oil tank. The casting 12 is provided with a horizontal portion 13 and with downwardly extending end and side portions 14 and 14<sup>a</sup> respectively, the end portions extending below the side portions. The casting has a greater length than breadth, the shorter side being parallel to the switch panel. At 15 is shown a rigid oil tank or receptacle made preferably from cast metal such as iron. The tank bears against the downwardly extending ends 14 and is secured thereto by a plurality of piv-

oted bolts 16 mounted in lugs 17 on the oil tank or receptacle and engaging slotted lugs 18 on the downwardly extending portions of the casting. The tank in this instance supports part of the switch elements as will be explained. The openings between the top of the oil receptacle and lower edges of the sides 14<sup>a</sup> are preferably closed by removable sheet metal slides or doors 14<sup>b</sup> shown in Fig. 2. This construction permits inspection of the contacts without necessitating a removal of the tank. The switch is secured to the switch panel by bolts which pass through the switch panel and through lugs 12<sup>a</sup> on the ends of the casting 12.

The top or horizontal portion of the casting is provided with three pairs of terminal openings arranged in two lines, from one end of the casting to the other, the openings of the two lines being staggered. Each pair of openings is for one pole of the switch, the three poles being arranged in a line at right angles to the switch panel. Located in each opening in the casting is a porcelain bushing 19 which supports a terminal rod or conductor 20 which extends down into the tank and is provided on its lower end with a pair of clamping nuts 21. Arranged lengthwise of the switch and at right angles to the switch-board is a rotary drum or spindle 22 made of insulating material, preferably wood. This drum is mounted in the downwardly extending end portions 14 of the casting, being supported at one end of the switch by a stud or pin 23 which is secured to the casting and extends into the drum, and at the other end of the switch by a spindle 24 passing through a lug 25 on the casting and secured to the drum by any suitable means such as a pin 26. The drum may be actuated either manually or automatically by any suitable mechanism. The drum is located in the middle of the switch, the terminals of each pole being located on each side of the drum.

Passing through the drum and secured thereto are a number of contact rods 27 being equally spaced and located opposite the terminal rods 20, there being two contact rods for each pole. The drum is in this case of irregular shape being provided with notched or recessed portions in which the upper ends of the contact rods 27 are located. Each contact rod is provided with a shoul-



dered portion 28 which fits in a suitable recess 29 in the lower part of the drum and is provided at its upper end with a pair of clamping nuts 30. As is clearly shown in the drawing, each contact rod is connected to one of the terminal rods 20 by a flexible lead or conductor 31, secured at one end between the clamping nuts 21 on the terminal rod and at the other end between the clamping nuts 30 on the contact rod 27. Any other suitable means may be employed if desired for electrically connecting the stationary terminal rods 20 and rotary contact rods 27. At the bottom of each contact rod is a contact 33 secured thereto by screws 34.

The stationary contact members of the switch are in this instance carried by the cast metal oil tank or receptacle, and are so mounted that they can be easily removed therefrom for inspection or repairs. At 36 is an insulating bar or base which carries the bridging contacts, as will be explained. The bar is carried by the oil tank or receptacle and is so supported that it can be accurately located in the tank or receptacle and easily removed for any purpose. In this instance the bar is supported by a strap or stirrup 37 made of rolled steel or other suitable stiff material. The strap is provided at each end with a bent portion 38 which extends over a finished lug on the end of the tank and is secured thereto by screws 39 the lower horizontal portion of the strap being spaced from the bottom of the tank. The bar 36 rests on the strap or stirrup which fits tightly into a groove 40 extending along the side and ends of the bar.

Although the bar may be supported in different ways I prefer the construction shown, since the bar can be accurately located relative to the movable contacts, by simply facing off the portions of the tank which are engaged by the bent ends 38 of the stirrup. Secured to the bar are a plurality of bridging contact members 41, one for each pole of the switch or for each pair of the contacts 33. Each bridging member consists of a base 42 of good conducting material and a pair of spring contact fingers 43, each of the latter having a contact face or tip 44 adapted to engage one of the movable contacts 33. Each contact base and the contact fingers 43 are secured to the insulating bar 36 by screws 45. The spring contact fingers 43 are preferably of such a length that the contact faces 44 are directly under the center of the drum so that the circuit is broken by a lateral and upward movement of the rotary contacts 33, the arcs at the points of rupture being drawn laterally and upwardly.

With the arrangement above described I obtain a switch which is very effective both from mechanical and electrical standpoints, for the reason that I am able to combine the advantages of a rotary switch such as sim-

plicity and rigidity of construction, with practically all the advantages of a side break switch, since the arcs are first drawn laterally from the stationary contacts and may rise in the oil or become bowed upwardly and hence tend to lengthen independently of the movement of the movable contact members. Therefore less actual movement of the movable contact members is required to break the arc than would be required in a down-break or up-break switch. In this instance each pole of the switch is separated from the adjacent pole and from the ends of the tank by vertical insulating barriers 46 and the contacts of each pole are separated from each other by vertical insulating barriers 47, so that there are solid insulating barriers between all adjacent points of rupture. Each barrier preferably consists of two portions which are in engagement with each other along the center of the rotary drum 22, the upper and lower portions each being provided with a semi-circular opening so as to fit closely around the drum. The upper portion of each barrier is in this case secured to the casting by screws 48 and the lower portion of each barrier is secured to the upper portion by connecting strips 49 and screws 50. The lower portions of the barriers are all provided with notched portions so as to fit closely over the insulating bar 36. The drum 22, and insulating bar 36 are provided with flanges 51 and 51<sup>a</sup> respectively on each side of the barriers, so as to prevent communication of the arc from any one pole.

From the above description it is evident that my switch is very simple in construction, rigid and compact. It will be seen that since the different poles are arranged in a line at right angles to the switch-panel that the width of the switch for a two or three phase circuit is no greater than the width of a switch for a single phase circuit, and therefore the switch can be easily applied to narrow switch-board panels.

It is apparent that many changes can be made in the details of construction, and I aim in my claims to cover all such changes 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 an oil switch or circuit breaker, a frame, an oil tank detachably secured to said frame an oscillatory switch member carried by said frame, one end of said member extending beyond the tank, contact rods carried by said member, said rods having contacts at their lower ends, a stationary insulating support below said oscillatory member and at one side of said tank, said stationary support having contact fingers which extend outwardly below said oscillatory support so as to be engaged by the contacts at the lower ends of the contact rods when the



latter are substantially vertical, whereby when said oscillatory support is shifted to open the switch the arcs will be drawn laterally and upwardly.

5 2. In an oil switch or circuit breaker, a frame, a detachable oil tank carried thereby, an oscillatory switch member mounted in said frame substantially centrally of said tank and having one end extending beyond  
10 the latter, said oscillatory member having contact rods extending through the same, contacts secured to the lower ends of said rods, a stationary insulating support carried by said tank below said oscillatory member  
15 and at one side of the tank, said stationary support having contact members which extend outward so that their ends are substantially vertically below the oscillatory switch member and are engaged by the contact rods  
20 when the latter are substantially vertical, whereby when said oscillatory switch member is shifted to open the switch, the arcs will be drawn laterally and upwardly.

3. In an oil switch or circuit breaker, a  
25 frame, an oil tank detachably secured thereto, an oscillatory switch member carried by said frame and located substantially centrally of the tank, one end of said oscillatory member extending beyond the tank, a plu-  
30 rality of pairs of contact members carried by said oscillatory member, a stationary insulating support carried by said tank and located at one side of the latter below the oscillatory switch member, said stationary  
35 support having a plurality of bridging contacts, each provided with contact fingers which extend outwardly and have contact faces substantially vertically below the oscillatory switch member, whereby when said  
40 oscillatory switch member is shifted to open the switch, the arcs will be drawn laterally and upwardly.

4. In a switch or circuit breaker, a supporting frame, an oscillatory drum journaled

therein, a plurality of rods having contacts 45 secured at their lower ends passing through and secured in said drum, a plurality of pairs of conductor terminals extending through the frame, and connected by flexible con-  
ductors to the upper ends of said rods, said 50 conductor terminals being in staggered relation and passing through the frame alternately on opposite sides of the drum, and a plurality of stationary bridging contacts adapted to be engaged by the movable con- 55 tacts.

5. In an oil switch or circuit breaker, a supporting frame, a movable switch member, a plurality of contacts carried by said member, an oil tank removably secured to 60 said frame, a plurality of stationary contacts adapted to be engaged by the movable contacts, an insulating supporting member carrying the stationary contacts, and means for supporting said insulating member com- 65 prising a rod or bar secured at its ends to said tank and engaging the latter at its ends only.

6. In an oil switch or circuit breaker, a frame, a movable switch member having a plurality of contact members, an oil tank de- 70 tachably secured to said frame, a plurality of stationary contact members adapted to be engaged by the movable contact members, an insulating bar supporting the stationary contact members, and means for 75 supporting said insulating bar on said tank, said means including a rod or bar having a horizontal portion engaged by said insulating bar and spaced from the bottom of the tank, portions extending upwardly along the sides 80 of the tank, and end portions engaging the tank and secured thereto.

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

HERBERT W. CHENEY.

Witnesses:

ARTHUR F. KWIS,  
FRED J. KINSEY.