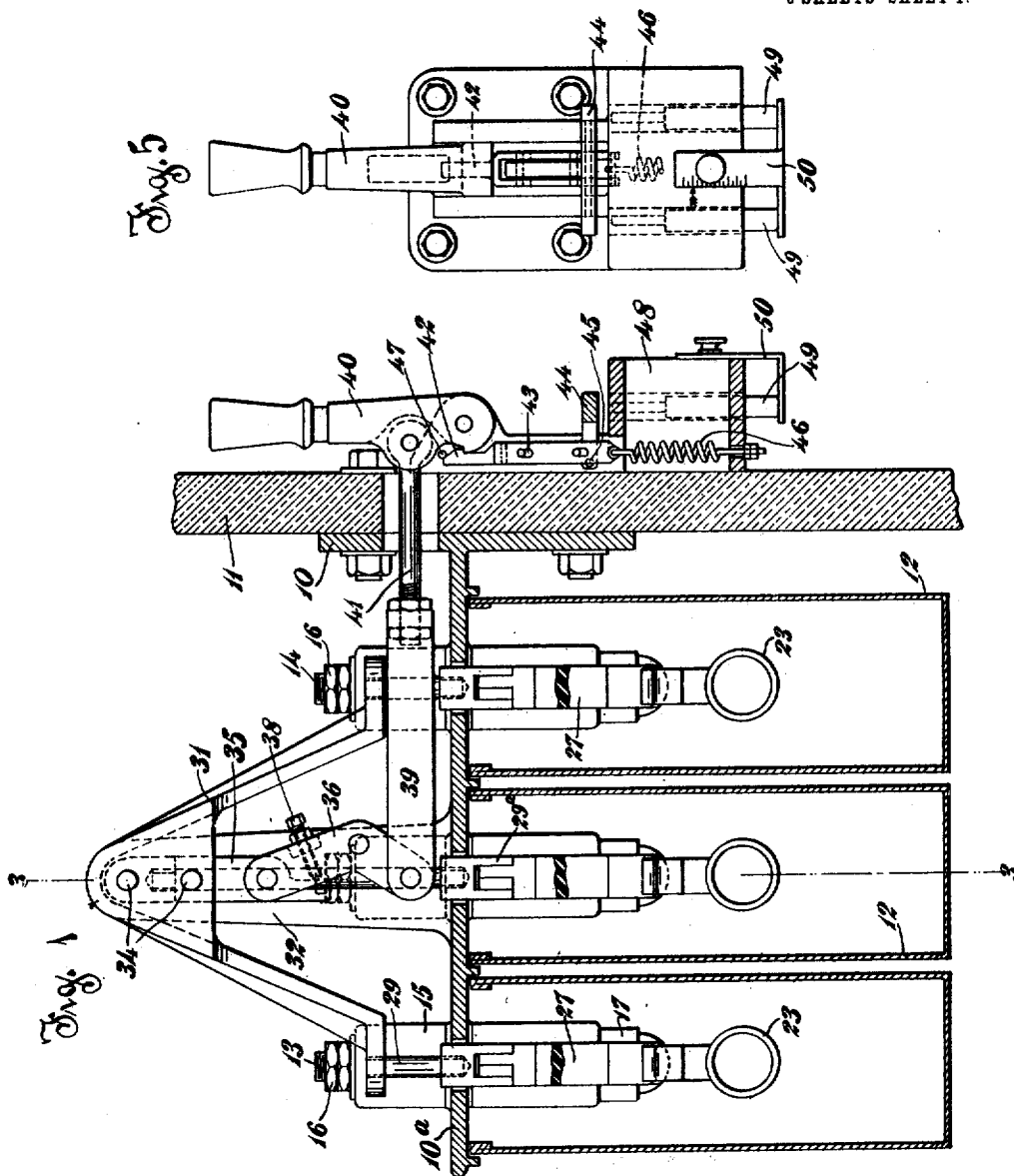


J. F. MENNINGEN.
OIL SWITCH.
APPLICATION FILED DEC. 30, 1907.

1,010,937.

Patented Dec. 5, 1911.

3 SHEETS-SHEET 1.



Witnesses

Oscar J. Harman
Fred J. Kinsey

Inventor
Joseph F. Menningen

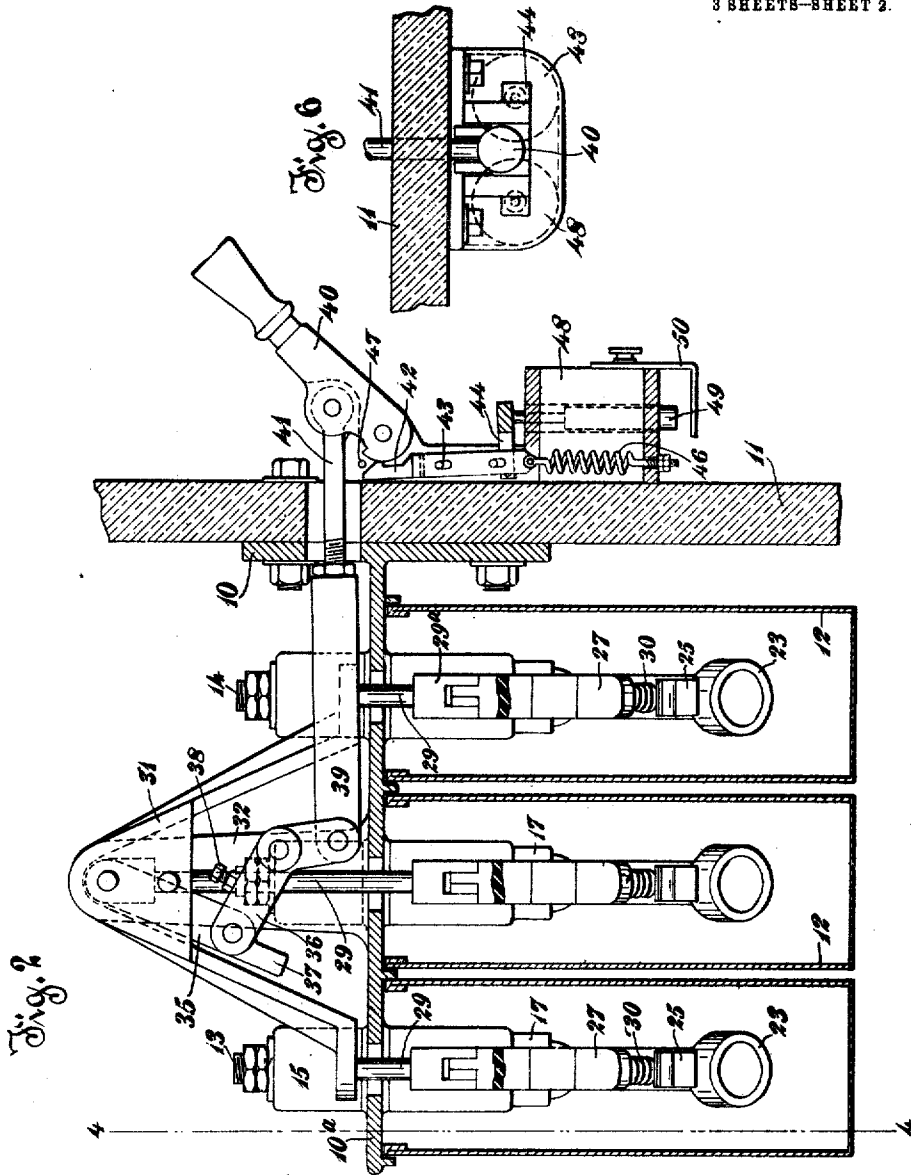
By
Geo. E. Lord
Attorney

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3 SHEETS—SHEET 2.



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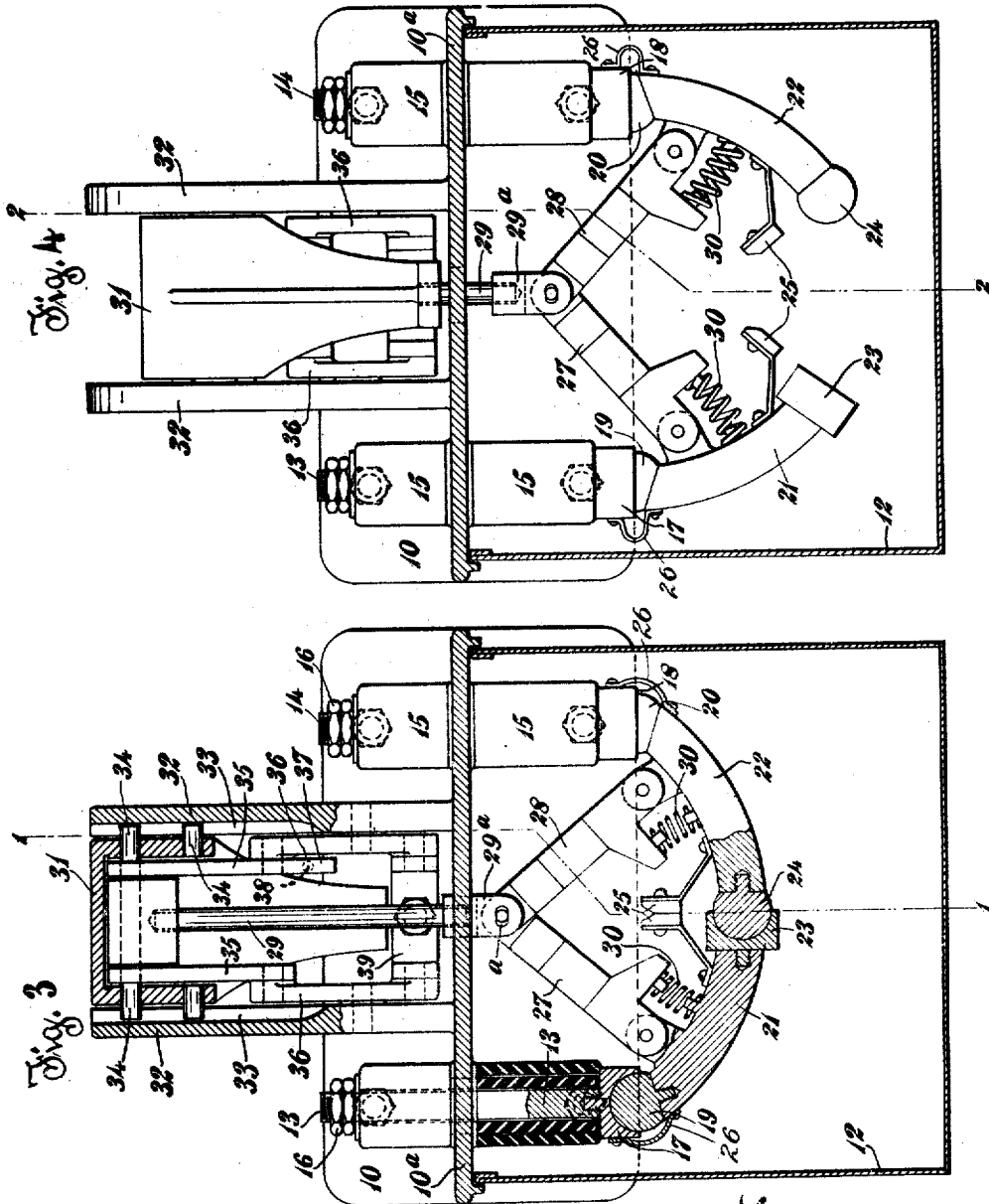
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3 SHEETS—SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH F. MENNINGEN, OF OAKLEY, OHIO, ASSIGNOR TO ALLIS-CHALMERS COMPANY, A CORPORATION OF NEW JERSEY, AND THE BULLOCK ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

OIL-SWITCH.

1,010,937.

Specification of Letters Patent.

Patented Dec. 5, 1911.

Application filed December 30, 1907. Serial No. 408,551.

To all whom it may concern:

Be it known that I, JOSEPH F. MENNINGEN, citizen of the United States, residing at Oakley, 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 switches for electric circuits.

It is the object of my present invention to provide a switch, especially one immersed in oil, which is simple in construction and operation and which will easily withstand the often excessive strains to which a switch is subjected.

In carrying out my invention there is provided a switch having two swinging arms the free ends of which engage to close the circuit and separate by movement of both of the arms to open the circuit. The engaging contact surfaces of these arms are preferably spherical, thus increasing the area of the contact and also lining up the two arms in case of any lack of adjustment. The swinging arms are pivoted by ball and socket joints. In the arrangement shown there are three sets of the swinging arms above described, one for each phase of a three phase circuit, and these three sets are preferably in separate removable oil tanks though arranged to be operated by a single handle.

The various novel features of my invention will appear from the description and drawings and will be particularly pointed out in the claims.

Figures 1 and 2 are longitudinal sections through the switch showing it in closed and open positions respectively, and are taken substantially on the lines 1—1 and 2—2 of Figs. 3 and 4 respectively; Figs. 3 and 4 are cross sections substantially on the lines 3—3 and 4—4 of Figs. 1 and 2 respectively, some of the parts in Fig. 3 being shown in section on other lines; Fig. 5 is a front view of the switch operating mechanism; and Fig. 6 is a plan view of the parts shown in Fig. 5.

In the arrangement shown, the supporting frame 10 of the switch is bolted to the back of the switch-board 11. However, this frame may be located at any suitable distance from the switch-board and may be

connected thereto by suitable connecting rods. A plurality of separate removable oil tanks 12 are attached to the bottom of the horizontal plate 10^a of the frame 10, and in each of the oil tanks are located switch parts constructed in accordance with my invention. As shown, there are three oil tanks and sets of switch parts, one for each main of a three-phase circuit.

Each set of switch parts consists primarily of two terminals 13 and 14 and two swinging arms 21 and 22. The terminals 13 and 14, which extend through insulating bushings 15 through the horizontal plate 10^a, are provided at the upper or outer ends with nuts 16 for connection to the mains of the circuit. Sockets 17 and 18 are screwed to the inner ends of the terminals 13 and 14 respectively, and with the nuts 16 lock the terminals and bushings in place. Balls 19 and 20 on the ends of the swinging arms 21 and 22 engage with the sockets 17 and 18 respectively. At the free ends of the arms 21 and 22 are a socket 23 and a ball 24 respectively, which are preferably similar in structure to the socket and ball 17 and 19 and serve as the separable contacting surface of the switch. Arcing tips 25 are in shunt to the ball and socket 24 and 23 and serve the usual purpose of arcing tips. Shunts 26 are placed around the contacting surfaces of the ball and socket joints at the pivotal ends of the swinging arms. Links 27 and 28, partly of insulating material, are attached to the arms 21 and 22 near the pivotal ends of the latter, and are pivoted together and to the stirrup 29^a at the lower end of the rod 29. Compression springs 30 are located between the arms 21 and 22 and lugs on the links 27 and 28 respectively, and tend to separate the switch arms 21 and 22 and hold the balls 19 and 20 in the sockets 17 and 18 respectively.

The various rods 29, which are of suitable and perhaps different lengths, are supported from the saddle piece 31 so that their lower ends are in substantial alinement. The saddle 31 is supported between guides 32, which extend upward from the horizontal plate 10^a and are grooved at 33 for the reception of pins 34 in the saddle 31, thus preventing tilting of the latter. The upper pin 34 extends horizontally through the saddle 31

and the upper ends of links 35, the lower ends of said links being pivoted to arms of bell-crank levers 36. One of the links 35 has an extension 37 for coöperation with a set screw 38 in the bell-crank lever 36 to limit the upward movement of the saddle 31. The bell-crank levers 36 are pivoted on the guides 32 and have their other ends attached to the fork 39, which is connected to the operating handle 40 on the front of the switch-board, as by the connecting rod 41.

When the handle 40 is in the position shown in Fig. 2, the switch is open as indicated in Figs. 2 and 4. By moving the handle 40 into the position shown in Fig. 1 the saddle 31 is raised and the ball and socket 24 and 23 on the ends of the arms 22 and 21 are brought into engagement, as shown in Fig. 3. The arcing tips 25 engage slightly before the ball and socket 24 and 23. If because of any inaccuracy of adjustment or inequality of wear the ball and socket at first fail to register exactly, the horizontal slots *a* in the stirrups 29^a allow them to force each other into position to register, which they will do. When the handle 40 reaches the position shown in Fig. 1 it is latched in such position by the latch 42, which is slidable vertically because of the pin and slot connection 43 with its supporting frame 44, while the latter is rotatable about a pivot 45. The latch 42 is held down and in by the adjustable spring 46.

To open the switch the handle 40 is pulled outward from the position shown in Fig. 1, thus sliding the latch 42 upward against the spring 46, so that by the engagement of the beveled upper end of the latch and the pin 47 the latch is disengaged from the handle 40. The spring 46 is sufficiently strong to prevent the springs 30 from opening the switch while the latch 42 engages the handle 40. In case of an overload one, or perhaps both, of the coils 48, which are in two of the three-phase mains of the sys-

tem respectively, lift their cores 49, as shown in Fig. 2, to tilt the frame 44 about its pivot and disengage the latch 42 from the handle 40, when the springs 30 will open the switch with a snap. The value of the current to which the coils 48 will respond may be regulated by means of an adjustable support 50 on which the cores 49 normally rest.

Many modifications may be made in the precise arrangement here shown and described, and I aim to cover all such modifications which do not depart from the spirit and scope of my invention as set forth in the following claims.

What I claim as new is:—

1. In a switch, the combination of two movable contact arms which each swing in a ball and socket joint, the free ends of said arms being provided with interfitting ball and socket engaging surfaces, and means for moving said arms to cause the engagement and disengagement of said surfaces.

2. In a switch, the combination of two movable contact arms which each swing in a ball and socket joint, the free ends of said arms being provided with interfitting ball and socket engaging surfaces, and a common operating means connected to both of said arms.

3. In a switch, the combination of two pivoted contact arms, the free ends of which are movable into and out of engagement, a link pivoted to each of said arms, a common operating means pivoted to said two links, and a spring acting between each link and the contact arm to which it is attached and tending to move such contact arm to separate it from the other contact arm.

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

JOSEPH F. MENNINGEN.

Witnesses:

GEO. B. SCHLEY,
FRED J. KINSEY.