S. T. HUTTON.

ROTARY CIRCUIT BREAKER.

APPLICATION FILED AUG. 19, 1910.

988,571.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

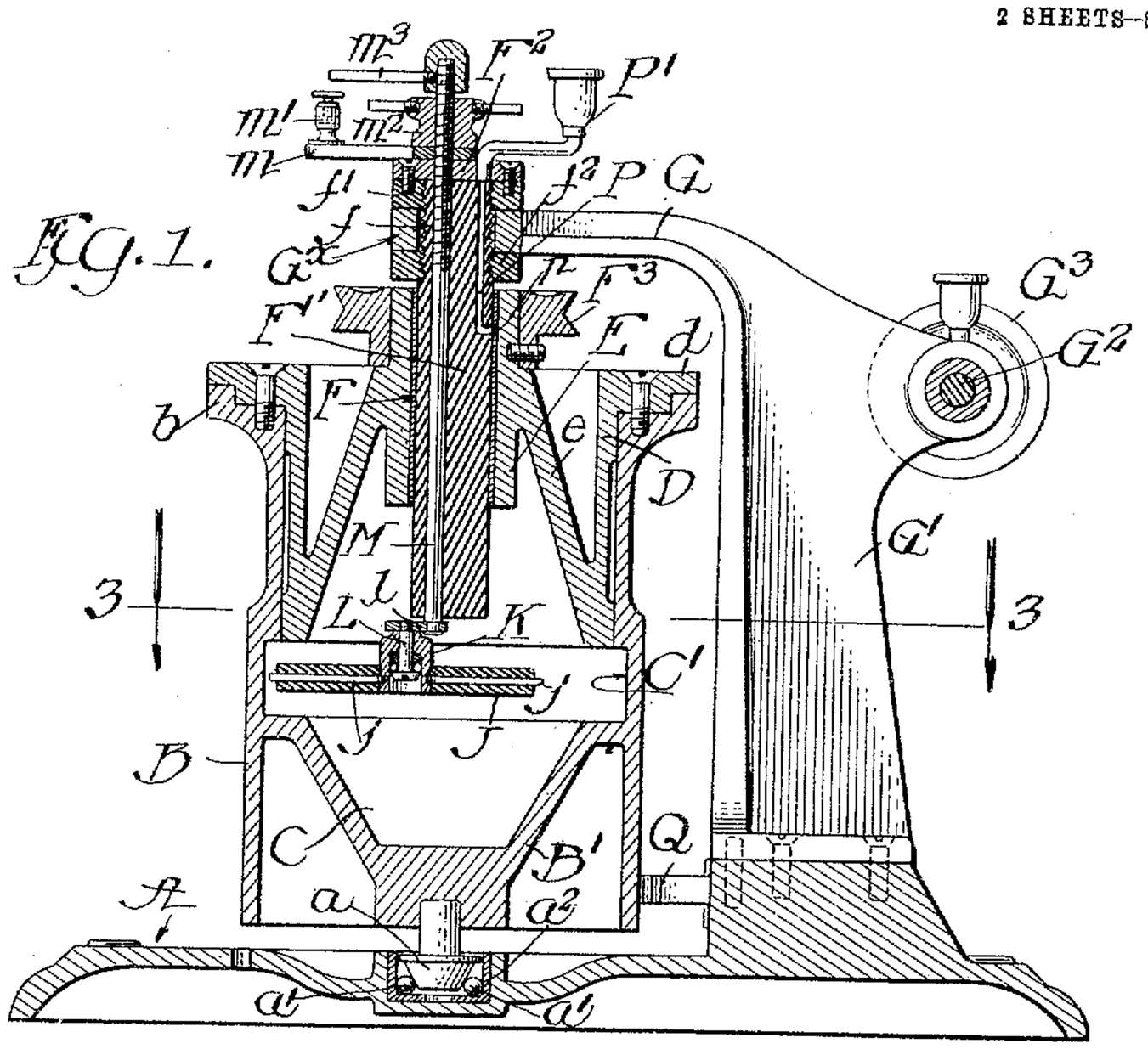
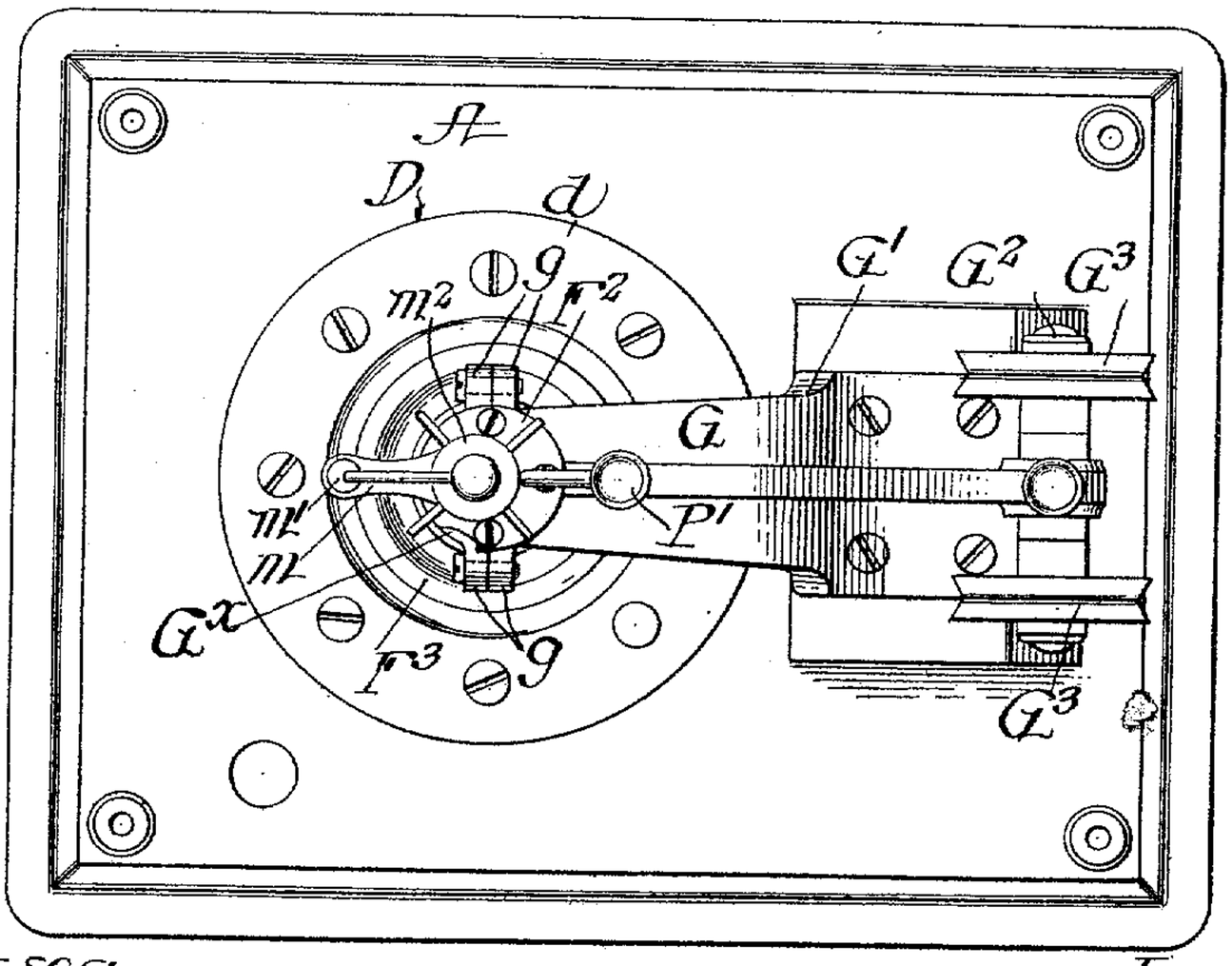


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

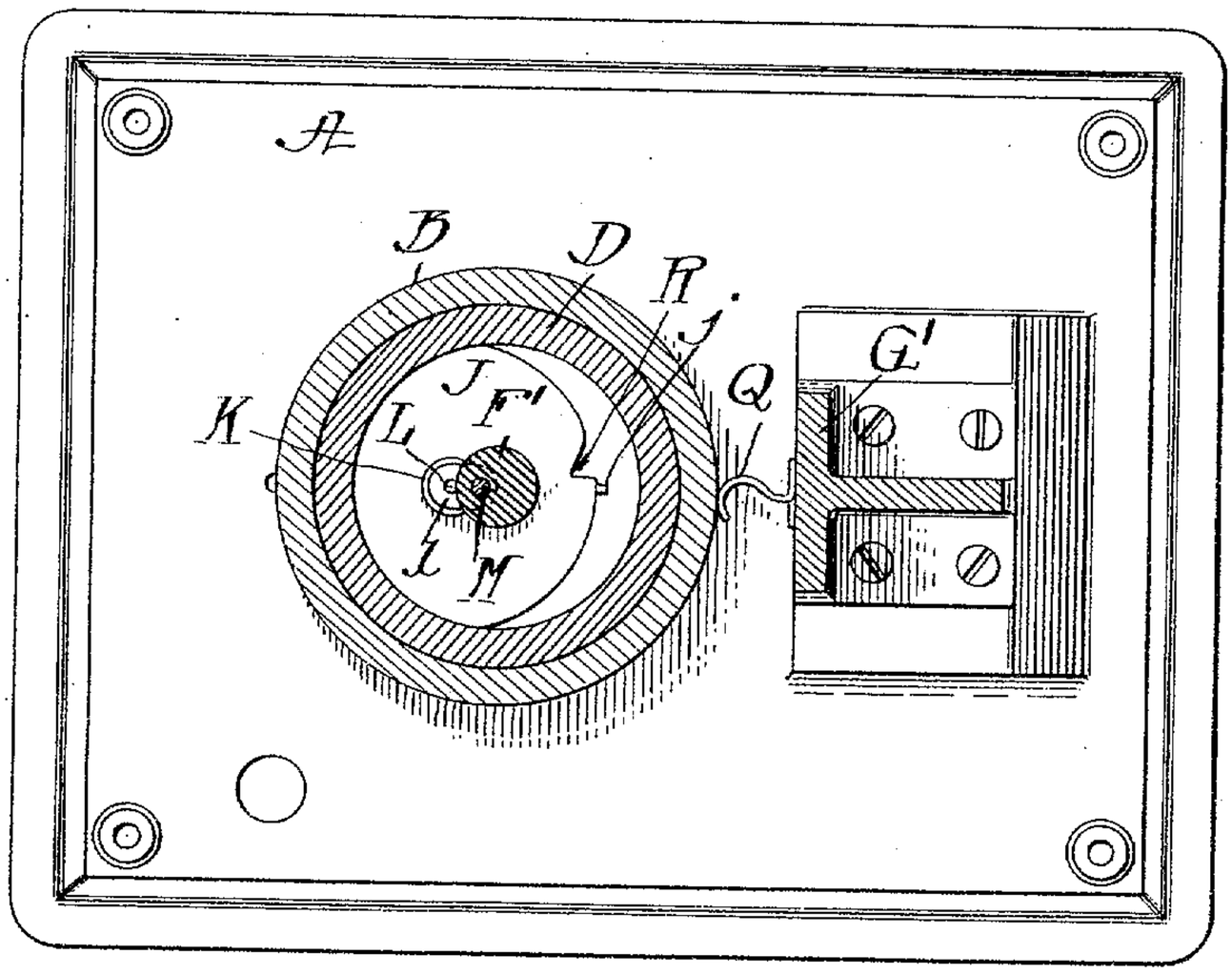


Fig. 4.

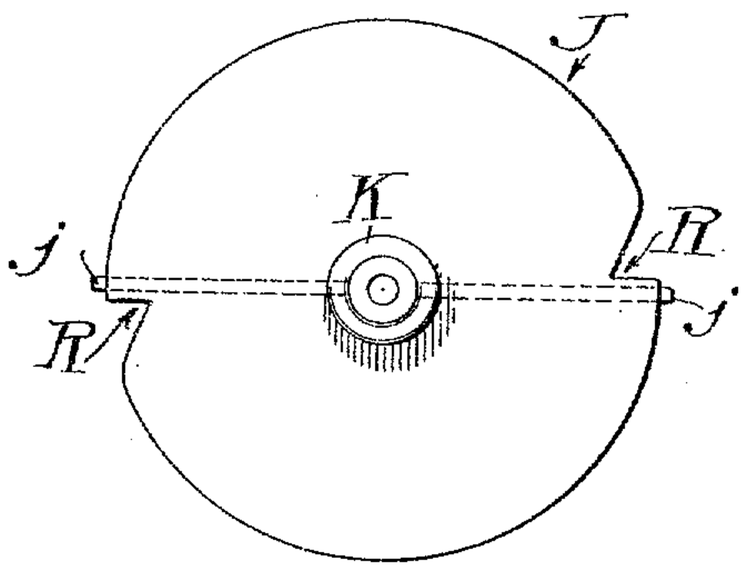
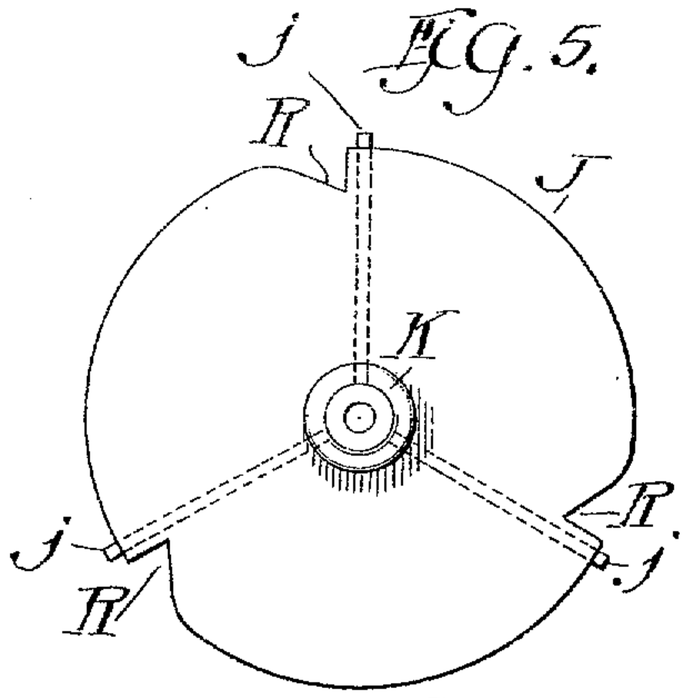


Fig. 5.



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ROTARY CIRCUIT-BREAKER.

988,571. Specification of Letters Patent. Patented Apr. 4, 1911.

Application filed August 19, 1910. Serial No. 578,030.

To all whom it may concern:

Be it known that I, SAMUEL T. HUTTON, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rotary Circuit-Breakers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in rotary circuit breakers and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a vertical section through the improved rotary circuit breaker. Fig. 2 is a top plan view of the same. Fig. 3 is a horizontal section through Fig. 1 on the line 3—3 thereof. Fig. 4 is a top plan view of the carrier for the rigid terminal. Fig. 5 is a similar top plan view of a modification of the same.

The rotary circuit breaker is supported on a base A.

B is a rotary cylindric metallic vessel which is adapted to contain the mercury or other conducting fluid forming one terminal of the circuit. Said vessel is provided with a conical bottom C having downwardly converging walls B^1, which contains the mercury when the vessel is stationary and with an annular recess C^1 above said bottom and of greater diameter than the greatest distance separating the walls B^1 thereof, into which recess the mercury is adapted to be drawn by centrifugal force due to the rapid rotation of the vessel B when in operation. The vessel B is closed by a cylindrical flanged cap D, the flange *d* of which is bolted to an annular flange *b* formed at the upper edge of the vessel. Said cap is provided with a centrally disposed long bearing E rigidly connected to the walls of said cylindric cap by means of a conical web *e*. In said bearing is located a long journal consisting of a metallic sleeve F surrounding a rod F^1 of insulating material, such as fiber, which is rigidly secured in any convenient manner to the outer end of an arm G which projects above the vessel and which forms part of a vertical standard G^1 bolted to the base A. To the outer end of said arm G is secured a removable strap $G^\times$. The arm and strap have abutting ears *g* which are secured together by bolts.

In the drawings, the upper end of the fiber rod F^1 is screw-threaded, as shown at *f*, to receive screw-threaded washers f^1, f^2 of fiber or other suitable insulating material which are located respectively above and below the arm G. A flat metallic disk F^2 is secured to the upper washer f^2. The lower end of the vessel is mounted in ball-bearings by means of a cone *a*, balls a^1, and cup a^2, the latter secured to the base A. A pulley F^3 is keyed to the upper end of the bearing F^1 and is adapted to be driven by a pulley G^3 keyed to a driving shaft G^2 which is journaled in the standard G^1.

J is a disk of fiber or other suitable insulating material which is drilled radially to receive two or more radially disposed rods *j* constituting the rigid terminal of the interrupter. Said rods project beyond the periphery of the disk at their outer ends and at their inner ends are screw-threaded into the cylindric wall of an inverted cup K which is suspended by a ball-bearing connection on a stud L. Said stud has a screw-threaded connection with a short arm *l*, the opposite end of which is rigidly connected to the lower end of a metallic conducting rod M which is eccentrically and rotatively mounted in the fiber rod F^1. The rod M, the arm *l*, the stud L, the inverted cup J, and the radially extending rods *j* are all of conducting material.

As the vessel B is rapidly rotated the mercury or other conducting fluid is drawn up into the channel C^1. The disk is adjusted to project slightly into the mercury when in this position, so that as the vessel is rapidly whirled about, carrying the mercury with it, the disk, by its engagement in the mercury is caused to rotate upon its axis and in its rotation to periodically, and with great rapidity, bring first one of the rods *j*, and then the next into and out of engagement with said mercury. By reason of the rapid whirling of the vessel the oil used for lubricating purposes which falls into the mercury cup, remains on the surface of the mercury, the two liquids being always maintained in separate layers by centrifugal

force. This is also true of the insulating oil such as kerosene, alcohol, or other similar liquids with which the mercury is preferably usually covered for purposes of insulation.

The rod M projects at its upper end above the disk F^2 and is there screw-threaded through a bar m, carrying a binding post m^1. A locking nut m^2 normally locks said rod against rotation. An adjusting pin m^3 is secured to the upper end of said rod for adjusting the position of the disk J with reference to the annular recess C^1.

P is a vertical oil passage extending from the upper end of the fiber rod F^1 to a radial passage p which extends through the sleeve F and supplies oil to the long bearing E. An oil cup P^1 is connected to said oil passage. Electrical connection with the mercury in the rotative vessel B is established by means of a brush Q secured to the standard G^1 in position to engage the outer surface of said vessel.

If desired, as where a more rapid interruption is required, the number of radial rods carried by the disk J may be increased;—as, for example, in Fig. 5, where three rods are shown, said rods being separated by equal angles. To insure the instant repulsion of the projecting end of the rod j from the mercury after its immersion therein, I prefer to provide notches R in the disk edge to the rear of the rod, which are engaged by the rapidly whirling mercury, to give the rotating disk an additional impetus after the rod end has entered the mercury.

I claim as my invention:—

1. A rotary circuit breaker embracing a rotary metallic vessel for containing a conducting liquid provided with a bottom having downwardly converging walls and an annular channel located above said walls, a rotative disk of insulating material eccentrically mounted within said vessel with one edge projecting into said channel, a rigid terminal carried by said disk and projecting beyond the edge thereof, and conducting means projecting into said vessel and insulated therefrom electrically connected to the said rigid terminal.

2. A rotary circuit breaker embracing a rotary metallic vessel for containing a conducting fluid provided with a bottom having downwardly converging walls and an annular channel located above said walls, a rotative disk of insulating material eccentrically mounted within said vessel with one edge projecting into said channel, a plurality of rigid terminals carried by said disk and projecting beyond the edge thereof, and conducting means projecting into said vessel and insulated therefrom electrically connected to said rigid terminals.

3. A rotary circuit breaker embracing a rotary metallic vessel for containing a conducting fluid provided with a bottom having downwardly converging walls and an annular channel located above said walls, a conductor rod projecting into said vessel and insulated therefrom, a freely rotative disk of insulating material carried by said conducting rod, and one or more radial, rigid terminals carried by said disk and electrically connected at their inner ends to said conducting rod, said rigid terminals projecting beyond the edge of said disks.

4. A rotary circuit breaker embracing a rotary metallic vessel containing a conducting fluid provided with a bottom having downwardly converging walls and an annular channel located above said walls, a base upon which said rotary vessel is rotatively mounted, a journal bearing for the upper end of said vessel embracing a tubular bearing rigidly connected with said vessel and a journal projecting into said vessel, a conducting rod eccentrically mounted in said journal and insulated therefrom, a freely rotative disk carried by said conductor rod, projecting at one edge into said channel, and radial, rigid terminal rods carried by said disk, said rigid terminals projecting at their outer ends beyond the edge of said disk and at their inner ends being electrically connected with said conductor rod.

5. A rotary circuit breaker embracing a rotary metallic vessel containing a conducting fluid provided with a bottom having downwardly converging walls and an annular channel located above said walls, a base upon which said rotary vessel is rotatively mounted, a bearing for the upper end of said vessel embracing a tubular bearing rigidly connected with said vessel and a journal projecting into said vessel, a conducting rod eccentrically mounted in said journal and insulated therefrom, said rod being rotatively mounted in said journal, a bar secured to the lower end of said rod, a freely rotative disk carried by said bar, projecting at one edge into said channel, and radial, rigid terminal rods carried by said disk, said rigid terminals projecting at their outer ends beyond the edge of said disk and at their inner ends being electrically connected with said conductor rod, and means for adjusting the angular position of said rod.

6. A rotary circuit breaker embracing a rotary metallic vessel for containing a conducting liquid provided with a bottom having downwardly converging walls and an annular channel located above said walls, a rotative disk of insulating material eccentrically mounted within said vessel with one edge projecting into said channel, a rigid terminal carried by said disk and projecting beyond the edge thereof, said disk having a notch in its periphery to the rear of the projecting end of said terminal, and conducting

means projecting into said vessel and insulated therefrom electrically connected to the said rigid terminal.

7. A rotary circuit breaker comprising a rotary metallic vessel for containing a conducting fluid provided with a bottom having downwardly converging walls and an annular channel located above said walls, a rotative disk of insulating material eccentrically mounted within said vessel with one edge projecting into said channel, a plurality of rigid terminals carried by said disk and projecting beyond the edge thereof, said disk having notches in its periphery to the rear of the projecting ends of said terminals, and conducting means projecting into said vessel and insulated therefrom electrically connected to said rigid terminals.

8. A rotary circuit breaker embracing a rotary metallic vessel containing a conducting fluid provided with a bottom having downwardly converging walls and an annular channel located above said walls, a base upon which said rotary vessel is rotatively mounted, a bearing for the upper end of said vessel embracing a tubular bearing rigidly connected with said vessel and a journal projecting into said vessel, said journal being made of insulating material, an upright standard having a horizontal arm projecting above said vessel, means for removably securing said journal to said arm, including a removable strap and rings of insulating material secured to said journal above and below said arm, a conducting rod eccentrically mounted in said journal and insulated therefrom, said rod being rotatively mounted in said journal, a bar secured to the lower end of said rod, a freely rotative disk carried by said bar, projecting at one edge into said channel, and radial, rigid terminal rods carried by said disk, said rigid terminals projecting at their outer ends beyond the edge of said disk and at their inner ends being electrically connected with said conductor rod, and means for adjusting the angular position of said rod.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 21st day of June, A. D. 1910.

SAMUEL T. HUTTON.

Witnesses:
GEORGE R. WILKINS,
T. H. ALFREDS.