

C. B. MILLS.  
CURRENT CONDUCTING DEVICE.  
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1,378,049.

Patented May 17, 1921.

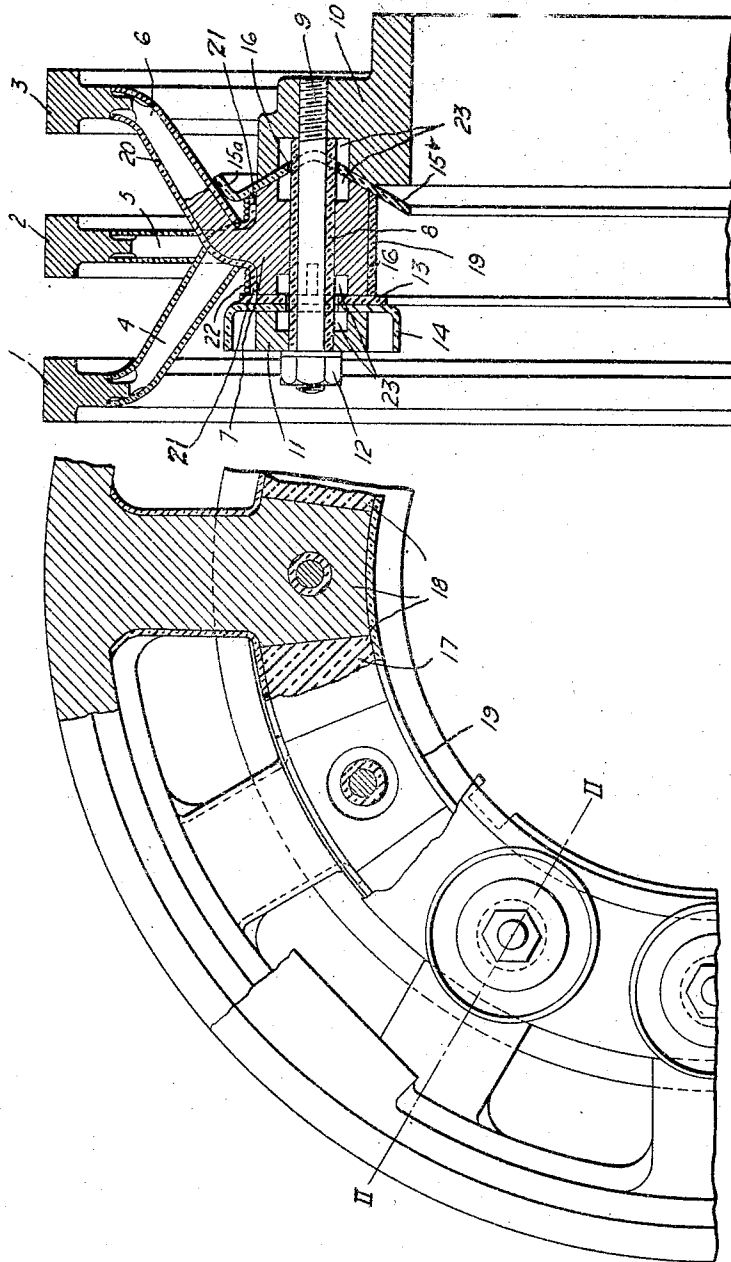


Fig. 2.

Fig. 1.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## CURRENT-COLLECTING DEVICE.

1,378,049.

Specification of Letters Patent.

Patented May 17, 1921.

Application filed October 24, 1917. Serial No. 198,330.

*To all whom it may concern:*

Be it known that I, CHESTER B. MILLS, a citizen of the United States, and a resident of East McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Current-Collecting Devices, of which the following is a specification.

My invention relates to current-collecting devices for dynamo-electric machines and particularly to collector rings for alternating-current motors.

The object of my invention is to provide a novel method of insulating the collector rings by means of which the said rings shall be well insulated from the supporting portion of the associated machine, and the creepage paths between rings and between rings and the supporting structure shall be unusually long.

In the adaptation of electrical apparatus to ship propulsion, it has been found difficult to properly insulate exposed current-delivering surfaces from grounded portions of the machines, because of the moisture and saline particles that are often present in the atmosphere in those portions of the ship containing the electrical apparatus. For this reason, special care has been taken to provide sufficiently long creepage distances between the collector rings and their supporting members.

By my invention, I provide a novel method of insulating the collector rings by which the rings, the supporting structure therefor and the insulation therebetween form a compact solid mass, providing no place for the entrance of any foreign matter, thereby eliminating the possibility of internal short circuits. Each supporting arm of the collector ring is so insulated that the creepage distance is increased by a distance equal to twice the length of a supporting arm.

Referring to the drawings, Figure 1 is a view, partially in section and partially in elevation, of a portion of a machine embodying my invention. Fig. 2 is a sectional view taken along the line II—II of Fig. 1.

A plurality of collector rings 1, 2 and 3 are respectively provided with inwardly extending, equally spaced supporting arms 4, 5 and 6, the inner end of each of which is provided with a lug 7 having an opening 8

through which a bolt 9 extends into a hub member 10 by which the collector rings are supported. Spacing members 11 are placed on the bolts 9, between the lugs 7 and nuts 12, to hold the lugs 7 in position. The spacing members 11 are insulated from the lugs 7 by means of an annular washer 13 and individual washers 14 of cup shape.

The lug 7 is insulated from the hub member 10 by means of an annular washer 15 of a substantially V shape in cross-section. Openings 16 are provided in the washer 15, at spaced intervals, to receive the bolts 9. A relatively small portion 15<sup>a</sup> of the outer edge of the washer 15 is bent nearly parallel to the inner portion thereof.

The lugs 7 are spaced from each other by means of insulating blocks 17 of wedge shape which, together with the lugs 7, form a compact ring member 18. A cylinder 19 of insulating material is made to fit snugly against the inner periphery of the ring 18 in order to prevent current creepage. The supporting arms 4, 5 and 6 are covered by sleeves 20 of insulating material, the lower ends 21 of which are flanged to cover that portion of the outer periphery of the ring 18 which is formed by the supporting lugs. The flanged portions 21 of the sleeves 20 are held against the ring 18 by means of cord 22 wrapped thereupon.

The joints between the various conducting members and the interposed insulating washers are made by cutting relatively small holes in the insulating washers, as shown at 16 and relatively large holes in the conducting members as shown at 23. After the insulated stud 9 has been passed through the holes 16 of the washers 13 and 15 and through the holes 23, the entire current-collecting device, except the contact surfaces of the rings, is coated with bakelite or some other suitable insulating liquid, and the unoccupied portions of the holes 23 are filled. The entire structure is then baked, forming a solid compact mass of the insulating and conducting parts, thereby preventing any movement therebetween or any possibility of foreign matter entering therein.

From the foregoing description, it will be apparent that there is no path through which the current might travel through any deposits of foreign matter except from one collector ring down the entire length of its

supporting arm, along the outer periphery of the ring 18 or along the hub member 10 and along the entire length of another supporting arm to the adjacent collector ring.

5 This path is purposely made long and of irregular contour, in order to provide a difficult path for the current to travel through any deposits of foreign matter on the machine.

10 While I have herein shown one form of my invention and described, in detail, one application of the same, it will be obvious to those skilled in the art, that it is not so limited, but is susceptible of various minor  
15 changes and modifications without departing from the spirit thereof and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or are set forth in the appended claims.

20 I claim as my invention:

1. A current-collecting device for dynamo-electric machines comprising collector rings mounted on arms of a spider, said arms being incased in insulating coverings.

25 2. A current-collecting device for dynamo-electric machines comprising collector rings having supporting arms incased in sleeves of absorbent insulating material impregnated with a suitable insulating liquid  
30 and having all joints in said material sealed thereby.

3. A current-collecting device for dynamo-electric machines comprising a plurality of collector rings provided with internally projecting supporting arms incased in sleeves of insulating material and provided with lugs at their inner ends, the lugs of all of said arms being in the same vertical plane and being separated from one  
40 another by blocks of insulating material.

4. A current-collecting device for dynamo-electric machines comprising a hub member, collector rings provided with inwardly extending arms provided with insulating sleeves and with lugs that are attached to said hub member, and an interposed annular insulating washer, of substantially V shape in cross section, having a relatively small portion of the side adjacent to the supporting arms bent substantially parallel, to the other side.  
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5. A current-collecting device for dy-

namo-electric machines comprising a hub member, a plurality of collector rings having inwardly-extending supporting arms, 55 lugs at the inner ends of said arms disposed in a single vertical plane and individually attached to said hub member by threaded means, all of said lugs being insulated from all of said threaded means by an interposed 60 annular washer of insulating material and cup shaped washers.

6. A current-collecting device for dynamo-electric machines comprising a hub member, collector rings having internally 65 projecting arms provided with insulating sleeves and with lugs at their ends, the lugs of said rings being in the same vertical plane and separated from one another by insulating blocks to constitute a composite 70 ring, a cylinder of insulating material fitted snugly against the inner periphery of said composite ring, an annular insulating washer of substantially V shape in cross-section between said composite ring and the 75 hub member, bolts for fastening said ring to said hub member, insulating sleeves and washers, spacers and an insulating ring cooperating with said bolts and said hub member, and a body of insulating material 80 surrounding said parts.

7. A current-collecting device for dynamo-electric machines comprising collector rings mounted on arms of a spider, and means for rendering the creepage path between adjacent rings of greater length than 85 the sum of the lengths of two supporting arms.

8. A current-collecting device for dynamo-electric machines comprising a plurality of collector rings, means for supporting said rings, and means for totally inclosing said supporting means within walls of insulating material.

9. A current collecting device for dynamo-electric machines comprising a plurality of collector rings, means for supporting said rings, and means for totally inclosing and sealing said supporting means within a casing of insulating material. 100

In testimony whereof I have hereunto subscribed my name this 22nd day of Oct. 1917.

CHESTER B. MILLS.