

No. 702,599.

Patented June 17, 1902.

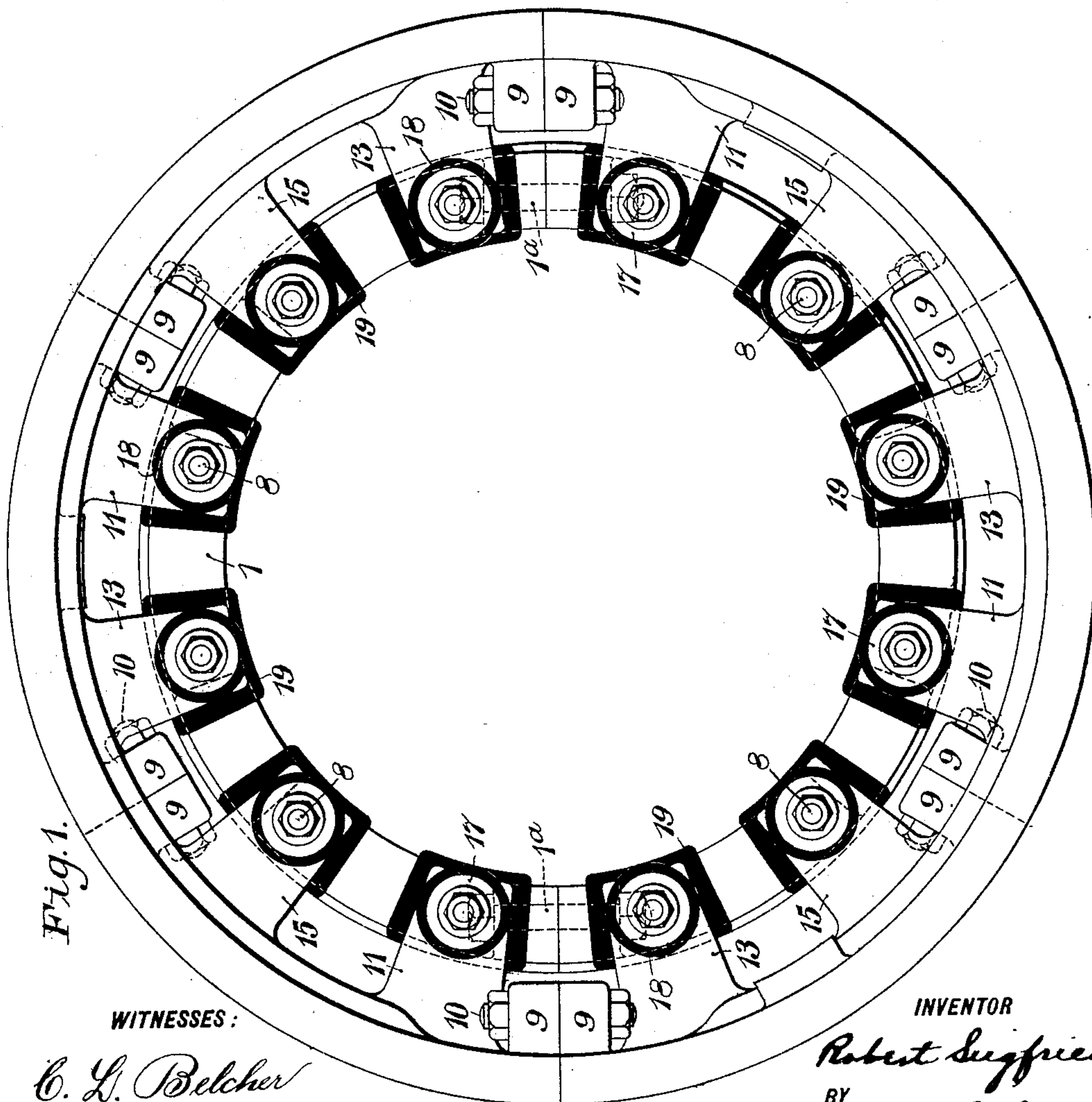
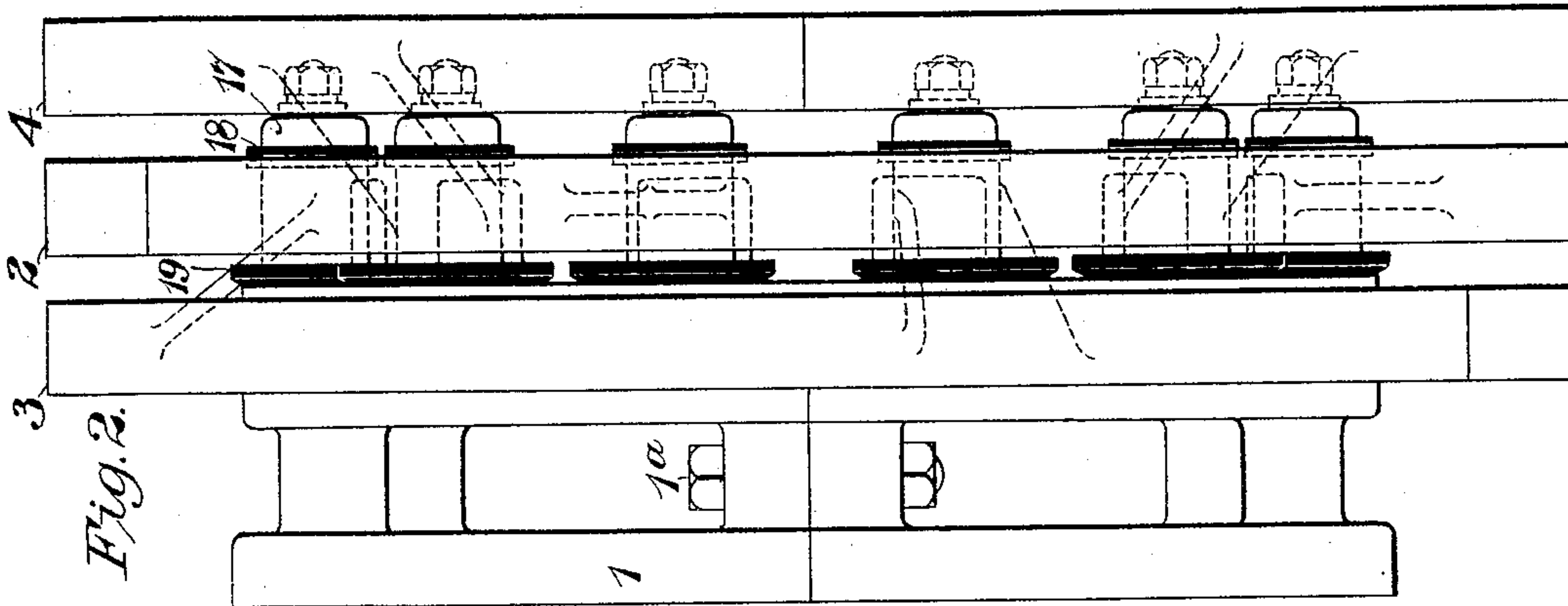
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COLLECTOR RING FOR ELECTRICAL MACHINES.

(Application filed Feb. 1, 1902.)

2 Sheets—Sheet 1.

(No Model.)



WITNESSES:

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Birney Hines

INVENTOR

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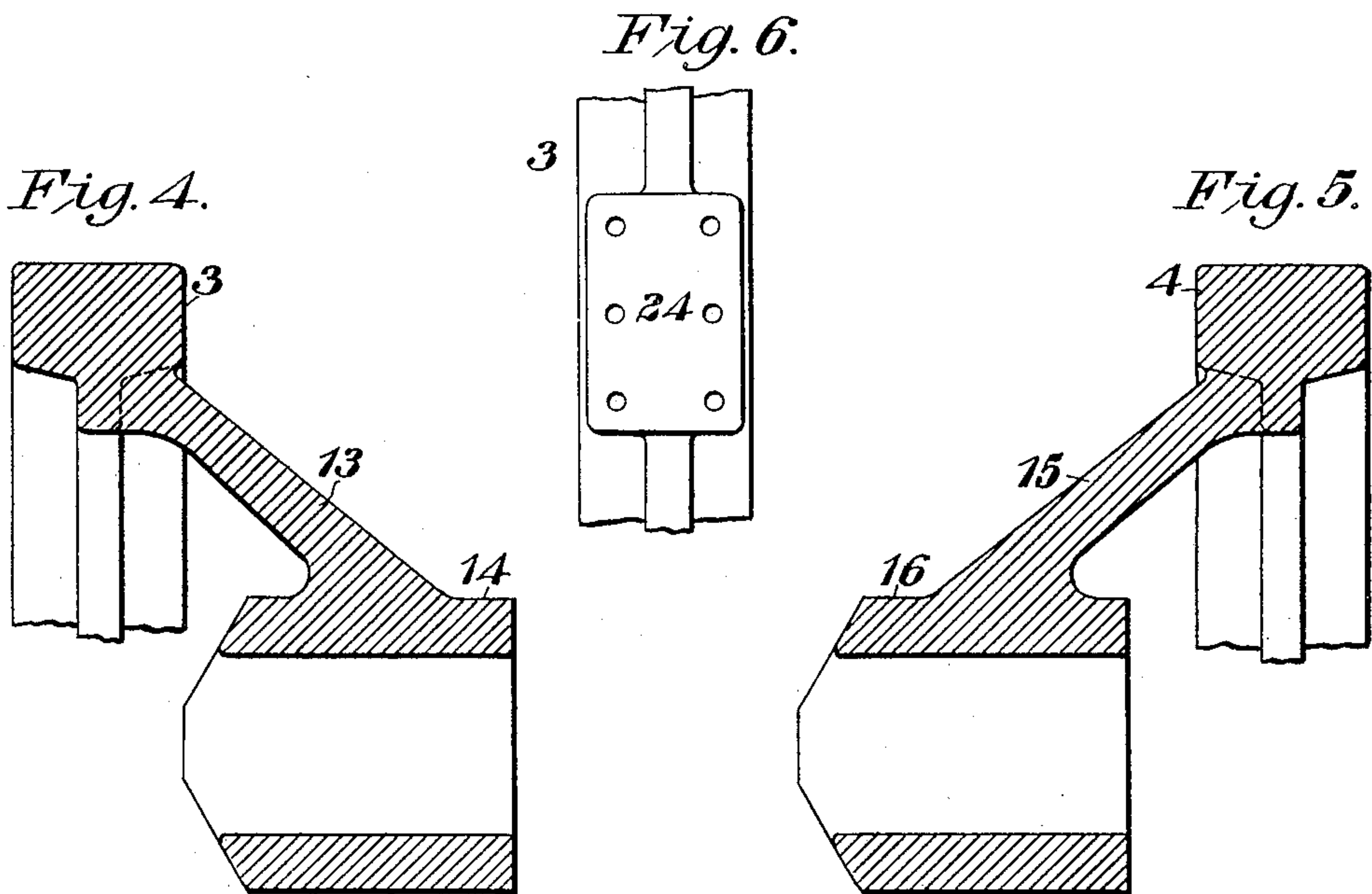
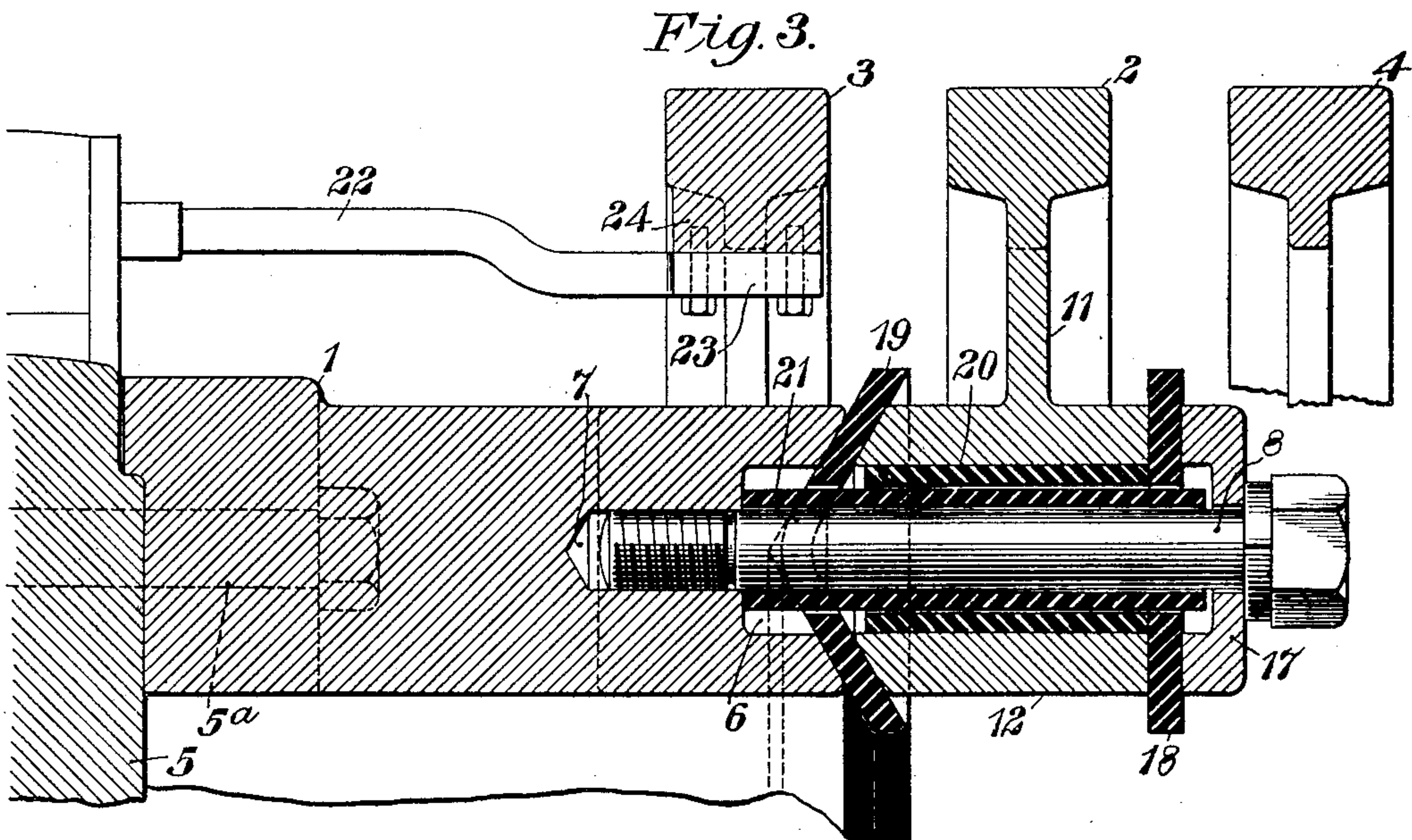
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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COLLECTOR-RING FOR ELECTRICAL MACHINES.

SPECIFICATION forming part of Letters Patent No. 702,599, dated June 17, 1902.

Application filed February 1, 1902. Serial No. 92,194. (No model.)

To all whom it may concern:

Be it known that I, ROBERT SIEGFRIED, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Collector-Rings for Electrical Machines, of which the following is a specification.

My invention relates to electrical machines, and particularly to collector-rings which are employed in connection with coöperating brushes for the purpose of either supplying electric currents to the windings to which the rings are connected or for taking currents from such windings and supplying them to external conductors.

The object of my invention is to provide a set of rings which shall be simple in construction, easily and cheaply manufactured, and readily secured in position and which shall be so constructed and supported as to be thoroughly ventilated and insulated and susceptible of ready removal when desired.

With these ends in view I have devised the means shown in the accompanying drawings, in which—

Figure 1 is an end elevation of a set of rings and their support. Fig. 2 is a side elevation of the parts shown in Fig. 1. Fig. 3 is a detail view, mainly in section, of portions of the rings and support shown in the preceding figures. Fig. 4 is a sectional detail view of a portion of one of the outer rings. Fig. 5 is a sectional detail view of a portion of the other outer ring. Fig. 6 is a detail view of the inner side of a portion of one of the collector-rings.

As here illustrated, my invention is adapted for use in connection with three-phase alternating currents; but it may be obviously employed in connection with currents of single phase, two phase, or, in fact, with alternating currents of any number of phases which it may be found desirable and practical to employ or with direct currents.

The annular support 1 for collector-rings 2, 3, and 4 is preferably made in two parts, which are fastened together by bolts 1^a, as indicated in Figs. 1 and 2. The support 1 may be securely fastened to the spider 5 of the machine,

in connection with which the rings are used, by means of bolts 5^a, a portion of the spider and one of the bolts being shown in Fig. 3. In order to lessen the amount of material employed, as well as to promote ventilation, the support 1 may be of skeleton or open-work construction, as indicated. The outer face of the annular support 1 is provided with a plurality of recesses 6, at the bottom of which holes 7 are drilled into the body of the support. The holes 7 are adapted to receive screw-threaded stud-bolts 8, the number of which may be varied to suit the ideas of the designer; but I have found it convenient and desirable where three collector-rings are employed to provide twelve of these stud-bolts and to space them equally about the support. If a greater or less number of rings were employed, it might be found desirable to vary the number and arrangement of these supporting devices.

For convenience of application and removal each of the collector-rings may be made in two parts having inwardly-projecting lugs 9, that are fastened together by means of bolts 10, as shown in Fig. 1.

The middle collector-ring 2 is provided with four inwardly-projecting arms 11, disposed equal distances from each other, and each of the arms is provided at its inner end with a boss 12, the outer end of which is parallel to the sides of the ring and the inner end of which is inclined or beveled, as indicated clearly in Fig. 3.

The inner ring 3, a portion of which is shown in detail in Fig. 4, is provided with four equidistant arms 13, that project downwardly and outwardly at a sufficient angle to provide the desired amount of space between this ring and the ring 2, and each of the arms is provided at its inner end with a boss 14, the outer end of which is parallel to the sides of the ring and the inner end of which is inclined or beveled in the same manner as are the inner ends of the bosses 12.

The outer ring 4 is provided with four equally-spaced arms 15, which project laterally at the same angle as arms 13, the only difference being that these two sets of arms

project in opposite directions, the arms 15 projecting inwardly toward the body of the machine when in position. The ends of the arms 15 are provided with bosses 16, that are
 5 the same in form and dimensions as the bosses 12 and 14. There being twelve bolts 8 and corresponding holes 7, it will be seen that the three sets of bosses 12, 14, and 16 may be sym-
 10 metrically disposed, so that their rings will be supported in the same manner and by substantially the same means, corresponding ends of the bosses being in the same plane perpendicular to the shaft of the machine.

A cap 17 is employed in connection with
 15 each of the bolts 8 for clamping the parts 12, 14, and 16 to the support 1, and in order to properly insulate the rings from each other and from the support 1 I provide annular washers 18, one for each cap 17 and bolt 8,
 20 the washers being clamped between the cap 17 and the bosses 12, 14, or 16, as the case may be. These washers may be made of mica or other suitable insulating material. I also provide washers 19, which may also be
 25 of mica or other suitable insulating material and which are preferably of approximately V shape in cross-section, so as to fit the beveled ends or edges of the support 1 at the sides of the recesses 6 and the corresponding ends of
 30 the bosses 12, 14, and 16. This construction of the inner ends of the bosses 12, 14, and 16, the edges of the support 1 at the sides of the recesses 6, and the washers 19 serves to center the collector-rings when they are bolted
 35 in position. Inside each of the bosses I locate a tube 20, of insulating material, and inside this tube and extending beyond the washer 18 in one direction and the washer 19 in the other I locate a second insulating-tube 21.
 40 Each ring is connected to the winding of the machine in connection with which it is used by means of a wire or bar 22, to the outer end 23 of which is bolted a boss or plate 24, that is formed on the inner face of the correspond-
 45 ing ring at the proper point in its circumference. It will be seen that with this construction the collector-rings are accurately located, securely supported in position, and thoroughly insulated from each other and from
 50 the machine and also that the rings may be readily removed for the purpose of renewing or repairing insulation or for any other purpose without serious difficulty or disarrangement of the machine as a whole.

55 In case only two collector-rings are employed it is of course feasible to make one of them like ring 2 and the other like either ring 3 or ring 4, or they might be made, respectively, like rings 3 and 4, although it would
 60 not be necessary to have the supporting-arms project at the same angle from the planes of the rings.

In case four rings should be employed the arms of the outer ones could correspond substantially to those of the rings 3 and 4 here
 65 shown, and the two inner ones might have

arms that were inclined at a lesser angle from the planes of the rings.

Whatever may be the number of rings they are all accurately centered and supported 70 upon the annular support 1, and since the latter is the only member of the combination which is fastened to the spider it follows that the collector-rings may all be assembled in
 75 operative relation to each other before being attached to the armature of the machine and that the combined rings and annular support may be readily placed in position and as readily removed as a unit whenever desired.

In general I desire it to be understood that 80 my invention is not limited to any specific form or relative location and arrangement of parts except in so far as limitations are imposed by the state of the art and expressly set forth in the claims. 85

I claim as my invention—

1. The combination with a rotatable support, of a plurality of collector-rings, arranged side by side and having supporting-arms that project into approximately the same plane 90 and means for fastening the said arms to the support.

2. The combination with a rotatable support, of a plurality of collector-rings, arranged side by side and having supporting-arms that 95 project into approximately the same plane and are provided with cylindrical bosses at their inner ends and bolts extending through said bosses and into the support.

3. The combination with an annular sup- 100 port, of a plurality of collector-rings, arranged side by side and having supporting-arms that project into approximately the same plane, means for insulating the rings from each other and from the support and fastening devices 105 for clamping the rings and insulating means in position.

4. The combination with an annular support, of a plurality of collector-rings, arranged side by side and having supporting-arms that 110 project inwardly into approximately the same plane and alternate with each other on the several rings, and bolts, insulating washers and tubes for attaching the rings to the support and insulating them therefrom and from 115 each other.

5. The combination with an annular support, of a plurality of collector-rings, arranged side by side and having supporting-arms that project inwardly into approximately the same 120 plane and terminate in hollow bosses having beveled inner ends and means for fastening said bosses to the annular support, the latter having beveled surfaces to cooperate with the beveled ends of the bosses. 125

6. The combination with an annular support, of a plurality of collector-rings each of which is made in two parts and is provided with supporting-arms that project inwardly at such an angle to the plane of the ring as 130 to bring the inner ends of all the arms into substantially the same plane and means for

fastening said arms to the support and for insulating the rings from the support and from each other.

5 7. The combination with an annular support, of a plurality of collector-rings each of which is provided with a plurality of inwardly-projecting arms that terminate in tubular bosses having beveled inner ends, the corresponding ends of all the bosses being in the
10 same plane, stud-bolts and caps for fastening the bosses to the annular support and insulating washers and tubes interposed between said parts.

15 8. The combination with an annular support having beveled end surfaces, of a plurality of collector-rings having arms which terminate in tubular bosses provided with beveled inner ends, insulating-washers interposed between the beveled portions of the
20 support and the beveled ends of the bosses and stud-bolts projecting through the bosses and into the annular support.

25 9. The combination with an annular support having end surfaces that are beveled inward toward each other in pairs, of a plurality of collector-rings each of which has uniformly-spaced arms terminating in hollow bosses having beveled inner ends, insulating-

washers for separating the bosses from the support, stud-bolts for fastening the bosses 30 to the support and tubes for insulating the bosses from the stud-bolts.

10. The combination with an annular support adapted to be detachably fastened to an armature-spider, of a plurality of collector- 35 rings arranged side by side and having supporting-arms that project into approximately the same plane and means for fastening the arms independently to said annular support.

11. The combination with an annular sup- 40 port adapted to be detachably fastened to an armature-spider, of a plurality of collector-rings arranged side by side and having supporting-arms that project into approximately the same plane and means for fastening the 45 arms of each ring independently to the support and for centering the rings with reference to the support and to each other.

In testimony whereof I have hereunto subscribed my name this 30th day of January, 50 1902.

ROBERT SIEGFRIED.

Witnesses:

G. A. F. AHLBERG,
BIRNEY HINES.