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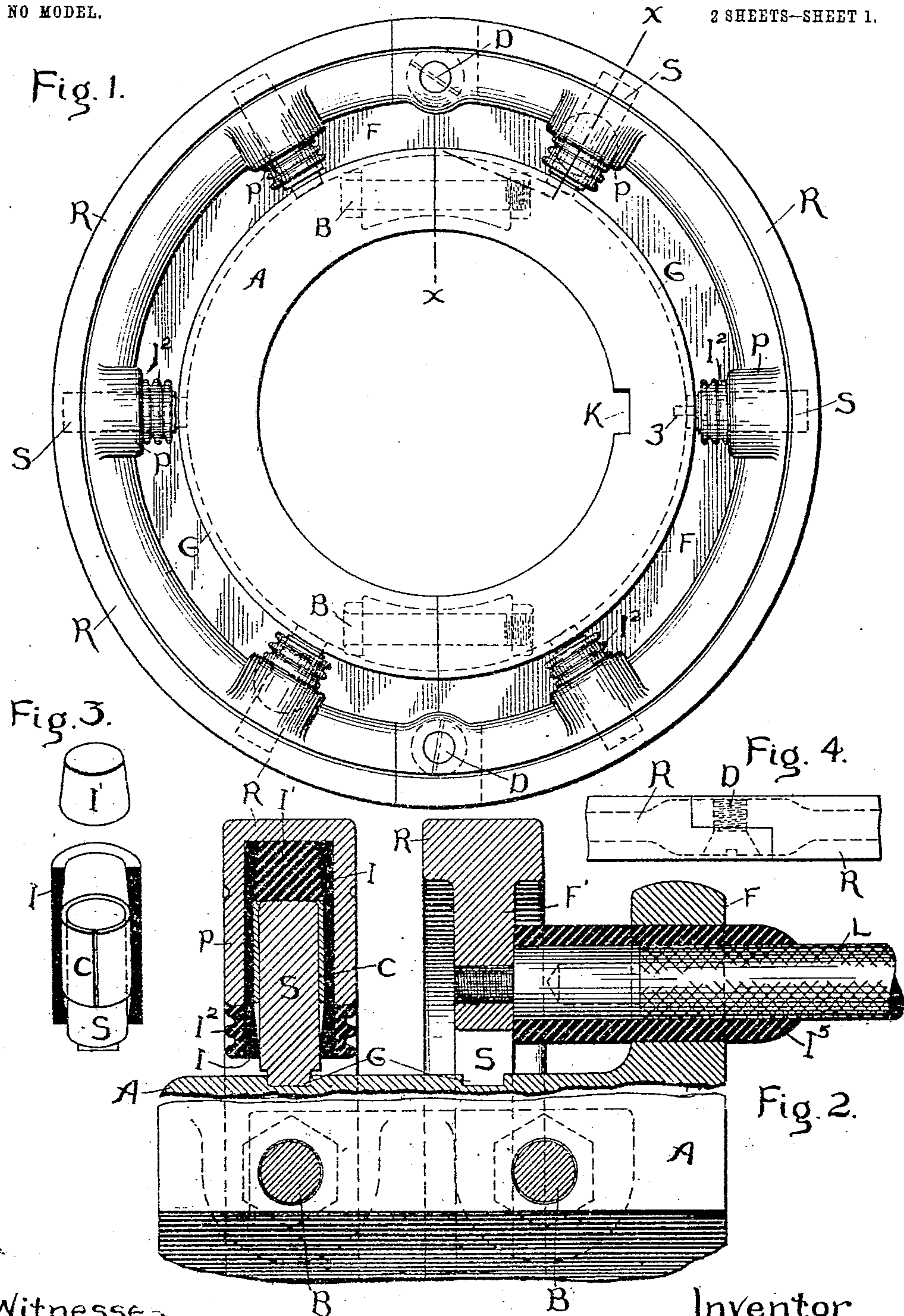
PATENTED OCT. 4, 1904.

H. G. REIST.
COLLECTOR RING.

APPLICATION FILED MAY 23, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

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Inventor

Henry G. Reist
by Albert G. Davis
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Fig. 5.

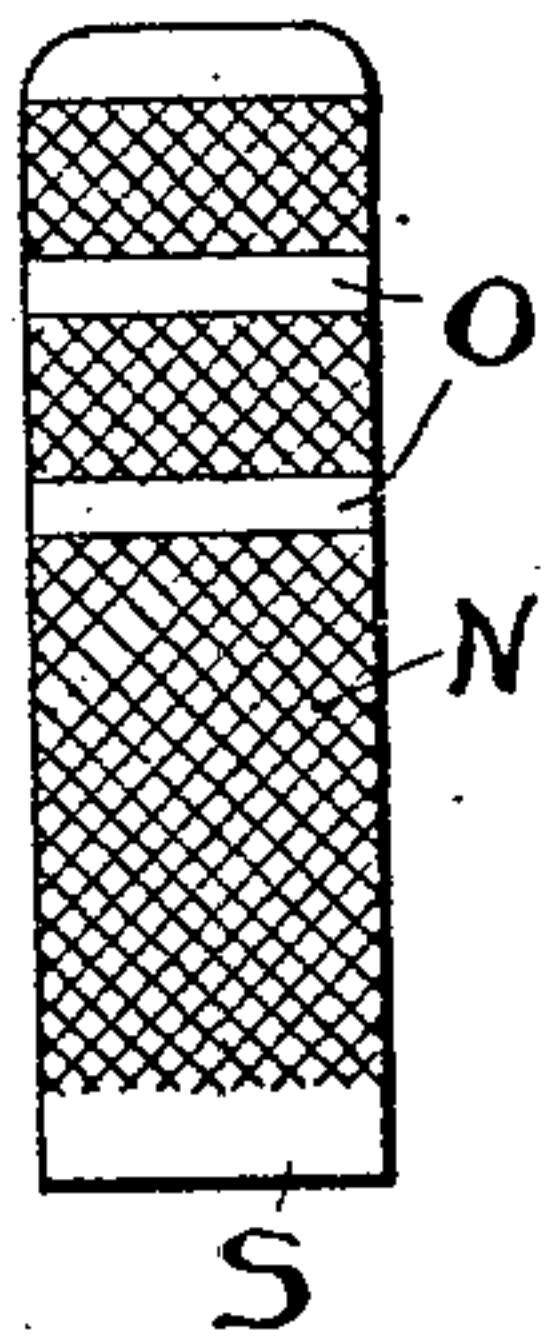


Fig. 7.

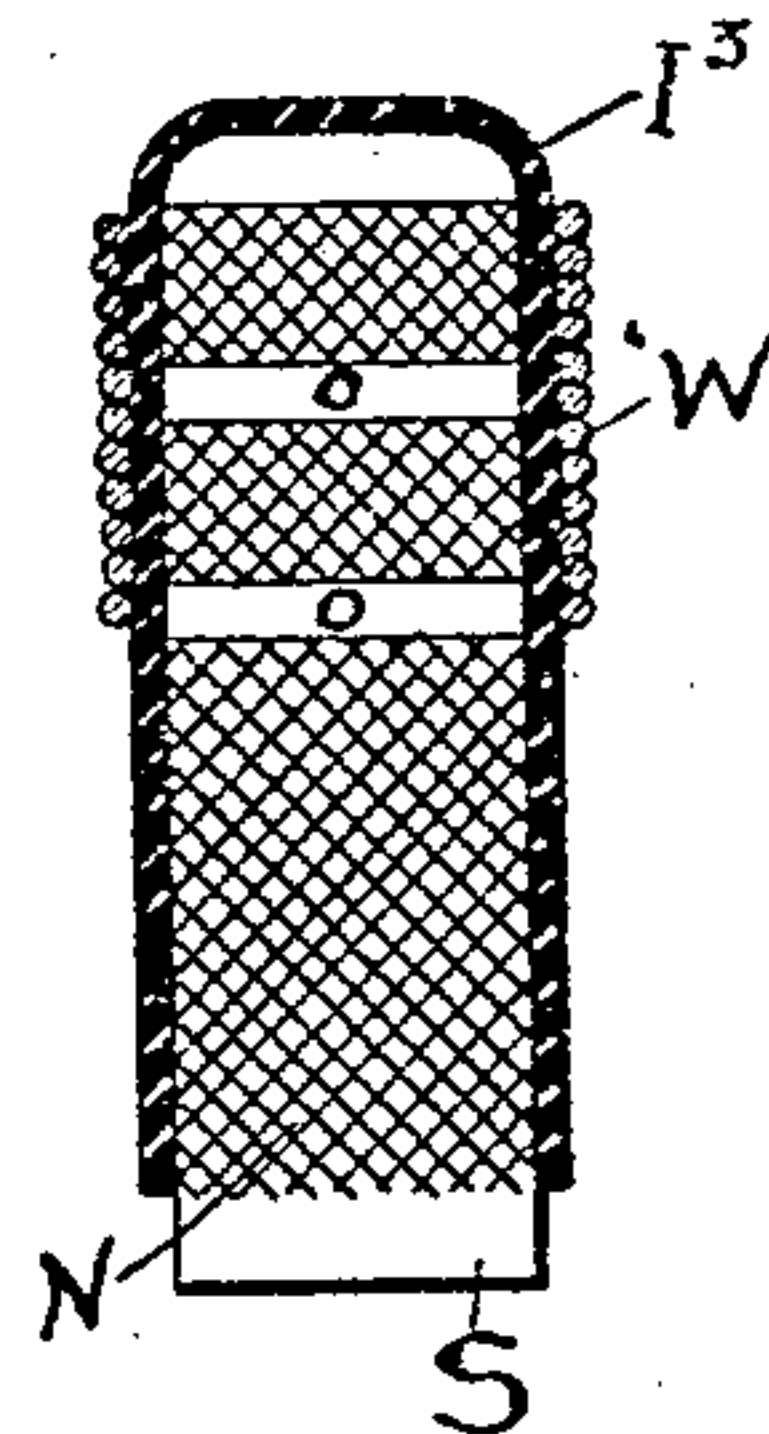


Fig. 6.

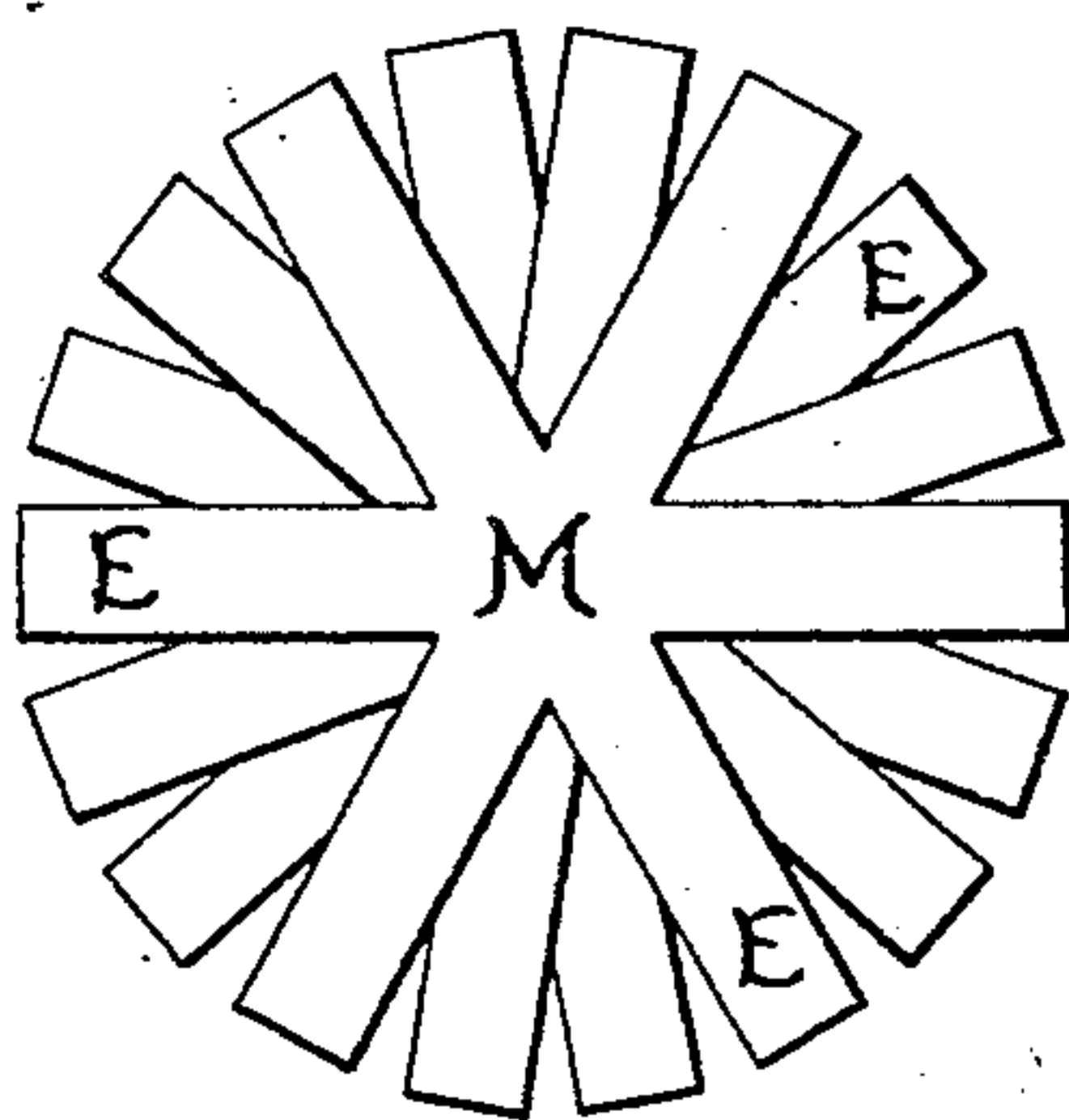


Fig. 8.

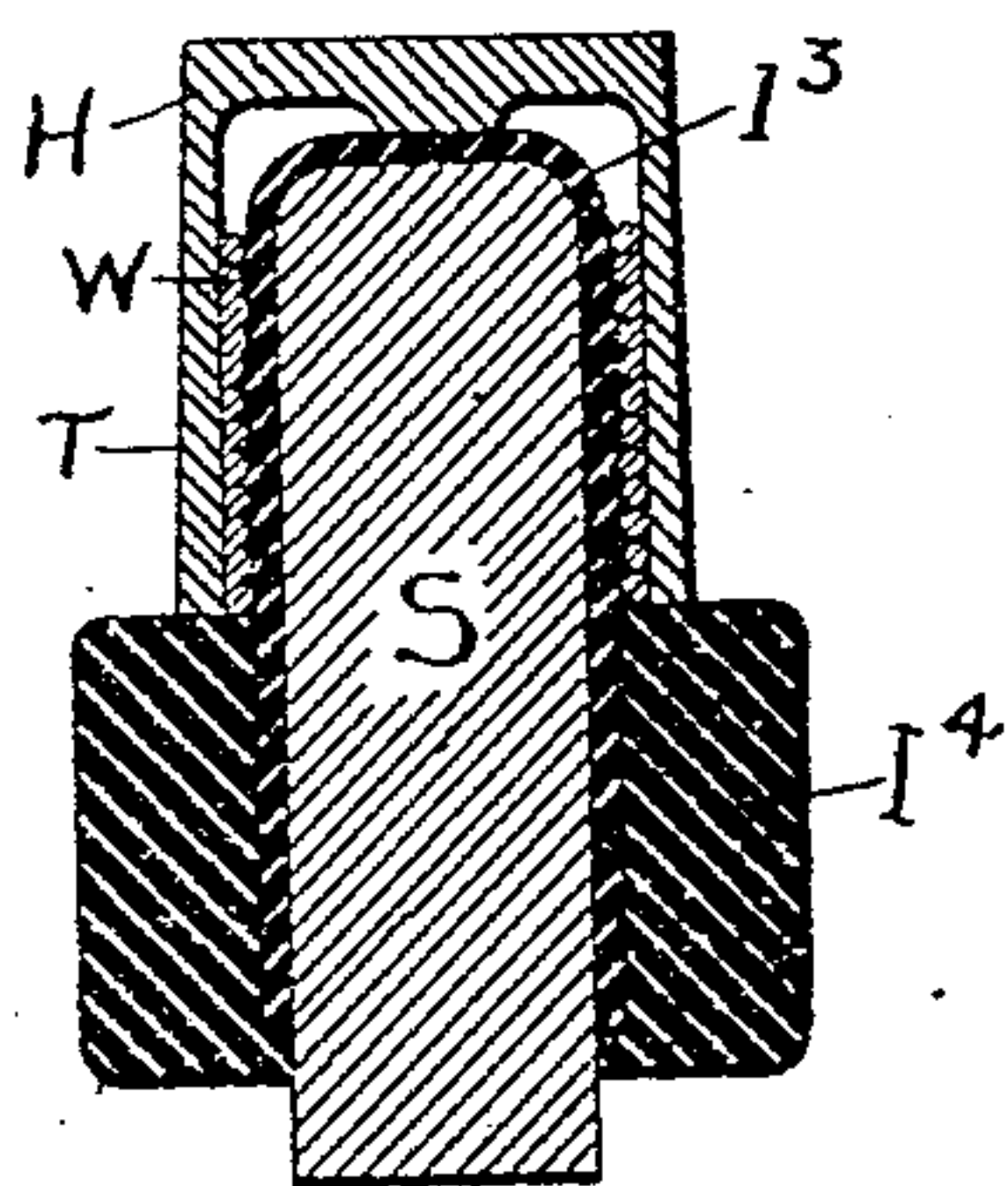


Fig. 9.

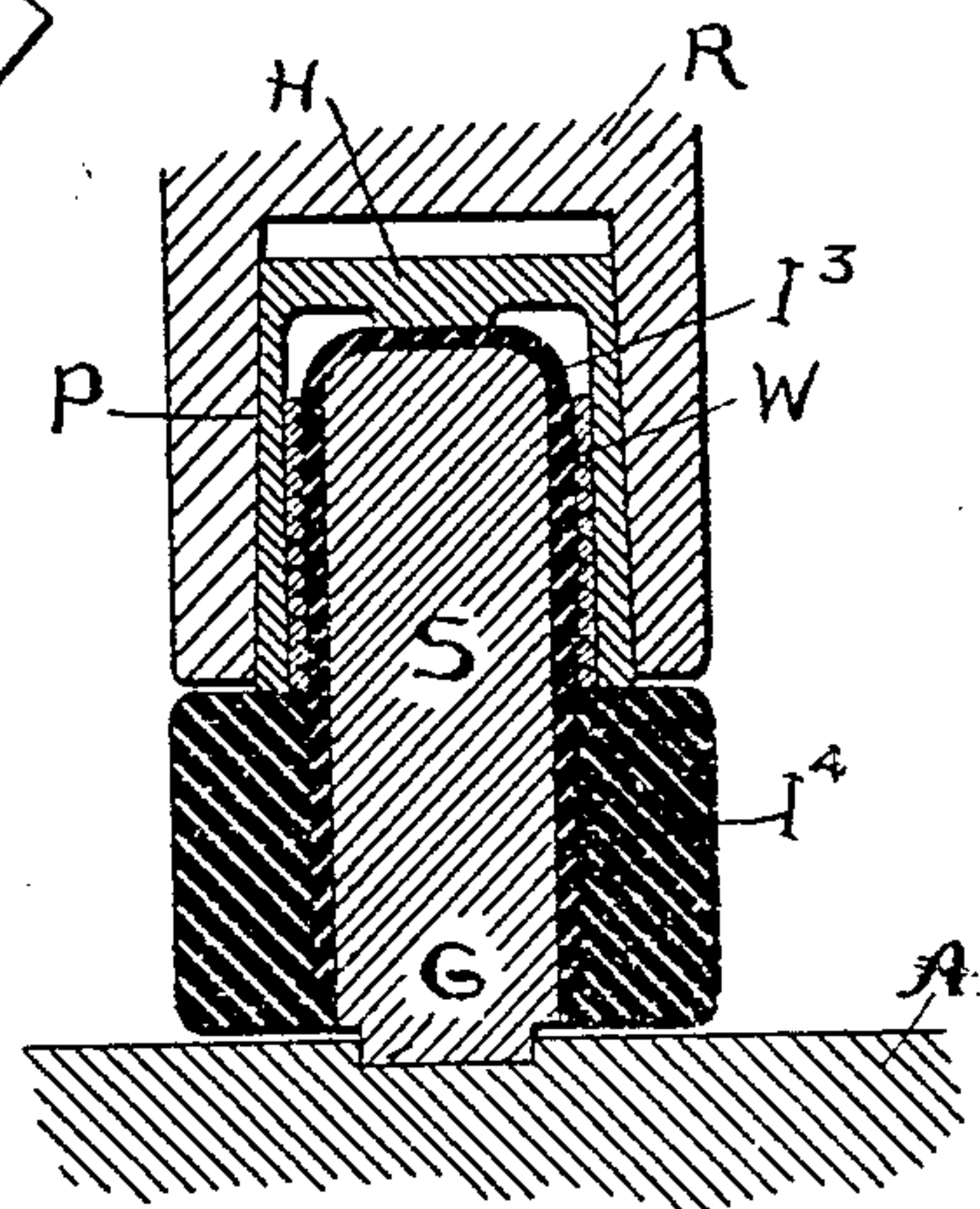
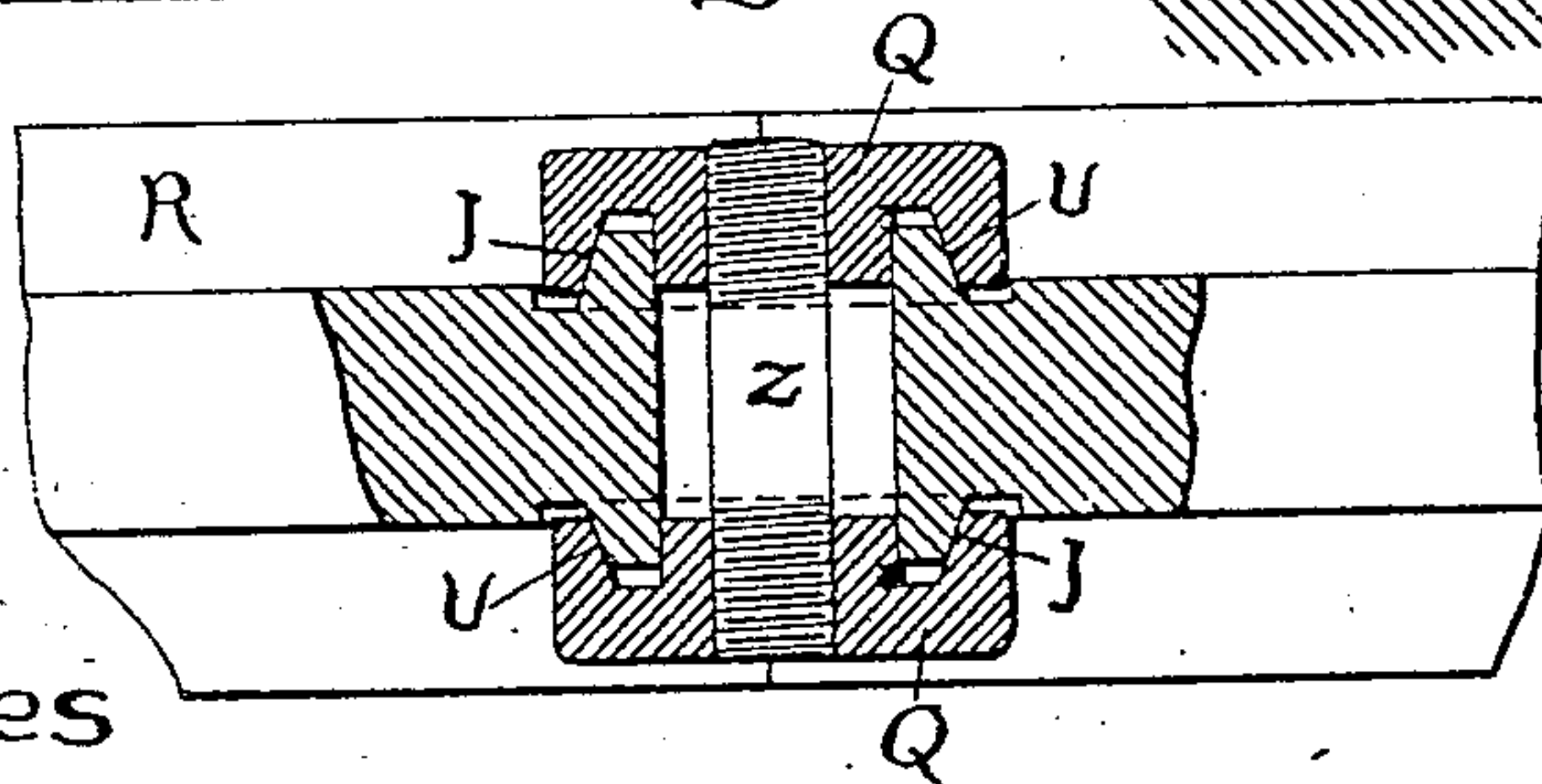


Fig. 10.



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UNITED STATES PATENT OFFICE.

HENRY G. REIST, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

COLLECTOR-RING.

SPECIFICATION forming part of Letters Patent No. 771,325, dated October 4, 1904.

Application filed May 23, 1901. Serial No. 61,517. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. REIST, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Collector-Rings, of which the following is a specification.

This invention relates to means for supporting one metal portion of an electrical apparatus operated at high potential upon another metal portion of the same apparatus in such manner that the two portions shall be effectually insulated from each other electrically.

The invention has especial application to collector-rings for alternating-current machines, as illustrated herein, or other machines having moving parts to or from which current is supplied; but its use may be extended to any other electrical apparatus.

In connection with collector-rings, to which the invention has especial reference, it may be stated that the means previously employed and disclosed in prior patents issued to me, while perfectly satisfactory for the uses for which they were designed, have proved inadequate to properly insulate the collector-rings of machines operating at considerably higher voltages. Collector-rings supported and insulated in accordance with the disclosure herein have been tested at ten thousand volts, and the insulation has stood the test without impairment.

The invention also provides means for avoiding the use of the insulating-rings, which have hitherto been required in multiphase machines between each pair of a plurality of adjacent collector-rings. It was necessary to employ such rings to insulate successive collector-rings from each other, because each ring was loosely mounted on the shell, and then all the rings were clamped together from the ends of the shell, so as to hold them in proper position thereon. In accordance with this invention each ring is independently held on the shell, so that the rings are not brought in contact with each other and the necessity for the use of the insulating-ring is avoided, with the result that the structure is well ventilated.

Owing to the independent mounting on each collector-ring and to the peculiar character of each individual insulating support or series of supports for one ring the creepage-surface has been greatly increased, and it is practically impossible for any collector-ring to be short-circuited. The method adopted for the accomplishing of this result consists in providing the inner periphery of each ring with a plurality of pockets and then fitting in these pockets plugs or arms, which insulate the rings from the shell or main support and which are secured to the shell to prevent movement of the rings thereon.

Of the drawings, Figure 1 is a side elevation of a single ring with its supporting-arms and main support. Fig. 2 is a section along the line X X of Fig. 1, showing portions of two collector-rings mounted on the shell or main support. Fig. 3 is a detail of one form of individual insulating-support. Fig. 4 is a view of the inside periphery of a collector-ring at the joint between two sections thereof, showing one means of securing the two sections or segments of the ring together. Figs. 5 to 9 are views illustrating steps in the process of making a preferred form of individual insulating-support, and Fig. 10 is a section showing a preferred manner of securing together the abutting ends of the segments of a collector-ring.

In Fig. 1, A is a metal shell or support which comprises two segments secured together by the bolts B and provided with a keyway K, whereby it may be splined to the shaft of the machine. The metal collector-ring R is also divided into two segments, the abutting ends of which interlock, as shown in Fig. 1, and are secured together by screws D. This ring is secured in place upon the shell A by means of the annular series of insulating supports or arms S, which engage in the shell A in such manner, as shown at 3, Fig. 1, to prevent relative movement of the shell and collector-ring. As shown in Fig. 2, each of these supports S has its lower end shaped so as to engage in portions G of the shell A adapted to receive it. Owing to this manner of supporting each

ring independently, as shown in Fig. 2, it will be seen that the necessity for the location of an insulating-ring between two successive collector-rings is avoided, and as the two rings are entirely separated by a considerable space the creepage-surfaces are very greatly reduced. Furthermore, each support S is effectively insulated from the collector-ring which it assists in supporting, and the creepage-surface with respect to the ring and each of its supports S is also greatly increased. The inner periphery of each collector-ring is formed with a plurality of pockets P, and in each of these pockets is located an insulating-cylinder I, of mica or other suitable material, and an insulating-block I', of wood or a suitable insulating compound. The plug-support S, provided with a split collar C for preventing the abrasion of the insulation, is tightly fitted into a pocket P against the insulation I and I'. A corrugated insulating-collar I² is located as shown in order to still further increase the creepage-surface. After all the supports or plugs S have been put in place the two segments of the collector-rings are placed upon the shell A, so that the ends of the plugs fit into grooved portions G of the shell, and the segments are then secured together by the screws D. Each collector-ring is connected in circuits by means of a conductor L, which is mounted in a flange F of the shell A, with intervening insulation I⁵, the lead L engaging at its end in an inner flange F' of the collector-ring.

On Sheet 2 is shown a preferred form of the support or plug S whereby better insulation is provided and in connection with which an improved method of securing the supports to the collector-ring can be carried out. In Fig. 5 is shown the core of the plug, which is provided with a knurled or other irregular surface N and with perforations O, all of which serve to prevent the insulating-sheath from slipping off the plug.

In Fig. 6 is illustrated the method of making the insulating covering or sheath for the plug (shown in Fig. 5) from a suitable number of star or spider shaped pieces of mica M, which are centered with their legs E offset. As shown in Fig. 7, these legs are spun or turned over in order to form an insulating-cylinder I³, open at one end, composed of the legs which break joint with each other and adapted to fit over the knurled lateral surface of the plug. After the cylinder I³ is fitted over the upper end of the plug wire W is wound tightly about it to cooperate with the knurled surface N and the perforations O in preventing the cylinder from slipping off from the plug. As shown in Fig. 8, the wire winding is covered with suitable soft solder, which is turned off to make a smooth surface to fit the interior of the metal cap H, which is formed with a tapered exterior surface T.

One advantage of this arrangement over that

shown in Fig. 2 will be at once seen to reside in the fact that the top of the plug is better insulated, as there are no joints either in the insulating-cylinder or the metal cap. A collar I' of suitable insulating material is then molded about the lower part of the support S around the lower part of the mica insulating-cylinder I³. The collector-ring, shown in partial section at R in Fig. 9 and provided with the pockets P, tapered to fit the tapered exterior surface of the metal cover H, is then heated to expand the pockets, and the plug provided with the cover or cap H, as shown in Fig. 8, is driven into the pocket. When the collector-ring cools, the pocket contracts, pressing the metal cap H against the wire W, which in turn presses the insulating-cylinder I³ against the knurled surface N and into the perforations O, so that the plug is firmly held in the pocket. It will be seen that the mica cylinder I³ provides a very great insulating-surface between the plug S and the metal parts in contact with the collector-ring and that the insulating-collar I⁴, interposed between the collector-ring and the shell A, assists in preventing the possibility of a short circuit between the collector-ring and the shell. As stated above, this device has been tested at ten thousand volts and has been found absolutely satisfactory. When each segment of the collector-ring has been provided with its insulating-supports, as above described, collars Q, provided with tapered surfaces U, as shown in Fig. 10, are screwed upon the ends of the bolt Z to engage in the semi-annular grooves formed in the abutting ends of the collector-ring segments and tapered, as shown at J, thus securing the segments in place about the shell A.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A collecting device, which comprises a metal support, a collector-ring having pockets around its inside periphery, and separate metal supporting-plugs engaging the support and fitting in and insulated from said pockets.

2. The combination with a collector-ring formed with pockets on its inside periphery, of metal caps fitting said pockets, metal supporting-plugs, and insulation surrounding said plugs, over which insulation said caps are fitted.

3. The combination with a collector-ring formed with pockets on its inside periphery, of a shell or support, and plugs engaging in said pockets and insulated from said ring, said shell being adapted to receive said plugs so as to prevent longitudinal movement of the ring.

4. The combination with a metal member provided with a pocket, of a metal plug, insulating material around the plug, wire tightly bound around the insulation to hold it in place, and a metal cap fitting around the wire, said cap fitting the pocket of said member.

5. The combination with a metal member

provided with a pocket, of a metal plug, a plurality of spider-shaped insulating members having their legs relatively offset and surrounding the plug, and a cap or sheath around the insulated members, said cap or sheath fitting the pocket in said metal member.

6. An insulating and supporting device, which comprises a plug having an irregular lateral surface, insulation around said surface and the top of the plug, wire for binding the insulation tightly against the irregular sides of the plug, and a metal cap which fits around the wire and covers the insulated end of the plug.

7. An insulating and supporting device, which comprises a metal plug, sheet insulation around the sides and one end of the plug, and a protecting metal cap which covers the insulation at the sides and end of the plug.

8. An insulating and supporting device, which comprises a metal plug, insulation around the sides and one end of the plug, a metal cap which covers the insulation on the end of the plug and a portion of the insulation at the sides, and an insulated ring molded about the remaining insulation around the sides of the plug.

9. An insulating and supporting device, which comprises a plug, sheet insulation around the side and end surfaces of said plug,

and a wire wound tightly about said insulation and covered with molten metal.

10. The combination with the segments of a collector-ring which are formed with grooves at their abutting ends, of a collar secured in position in said grooves to hold the segments together.

11. The combination with the segments of a collector-ring which are formed with registering grooves at their abutting ends, of a bolt, and a collar which is screwed upon said bolt to lie in said grooves and secure the segments together.

12. The combination with the segments of a collector-ring which are formed with registering tapered grooves, of a tapered collar secured in position in said grooves to hold the segments together.

13. The combination with the segments of a collector-ring which are formed with registering semi-annular grooves, of a collar which is secured in position in said grooves to hold the segments together.

In witness whereof I have hereunto set my hand this 21st day of May, 1901.

HENRY G. REIST.

Witnesses:

BENJAMIN B. HULL,
FRED RUSS.