

No. 619,299.

Patented Feb. 14, 1899.

J. R. GRINDROD.  
RETAINING BAND FOR COMMUTATORS.

(Application filed Nov. 5, 1898.)

(No Model.)

FIG. 1.

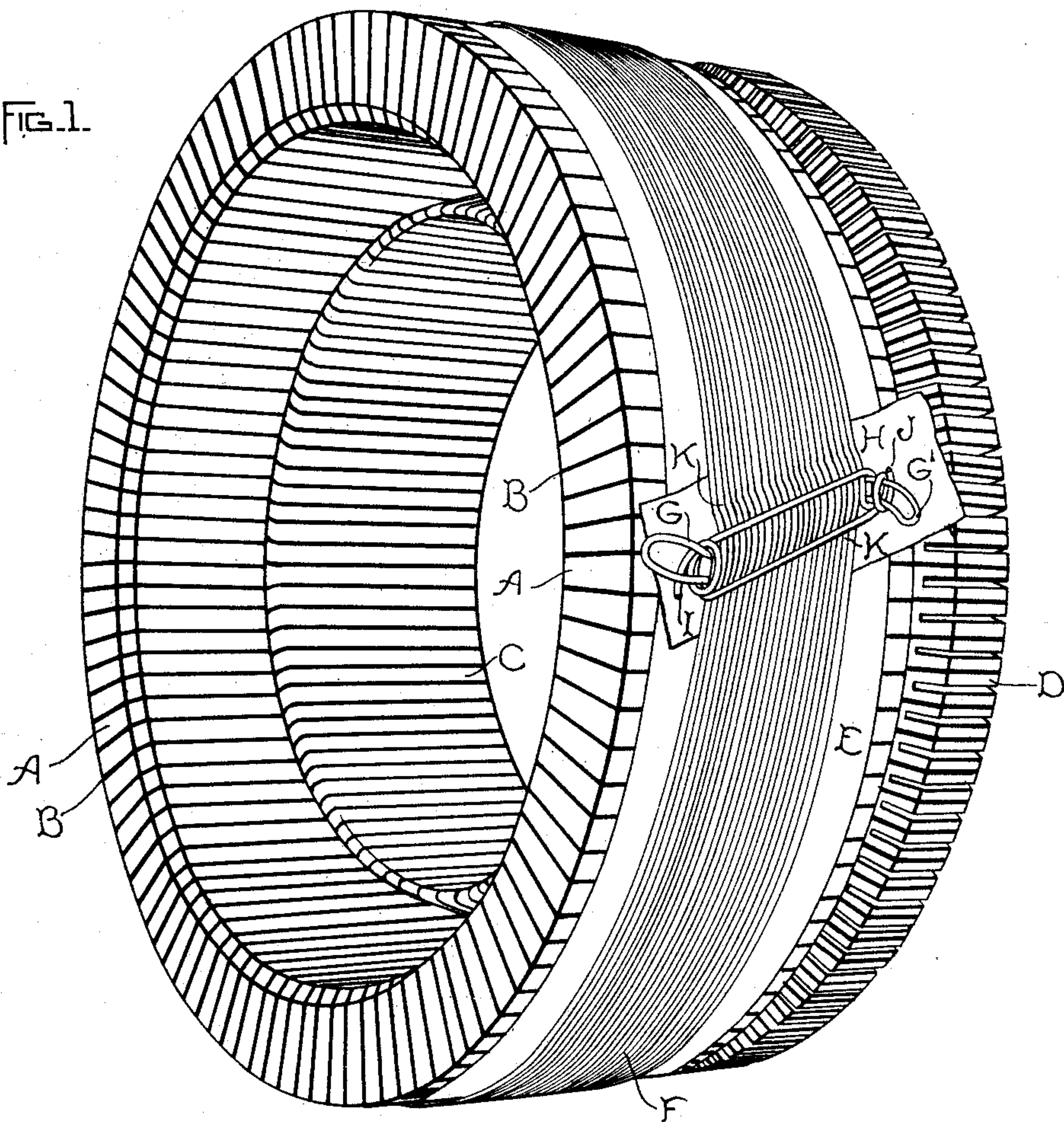


FIG. 2.

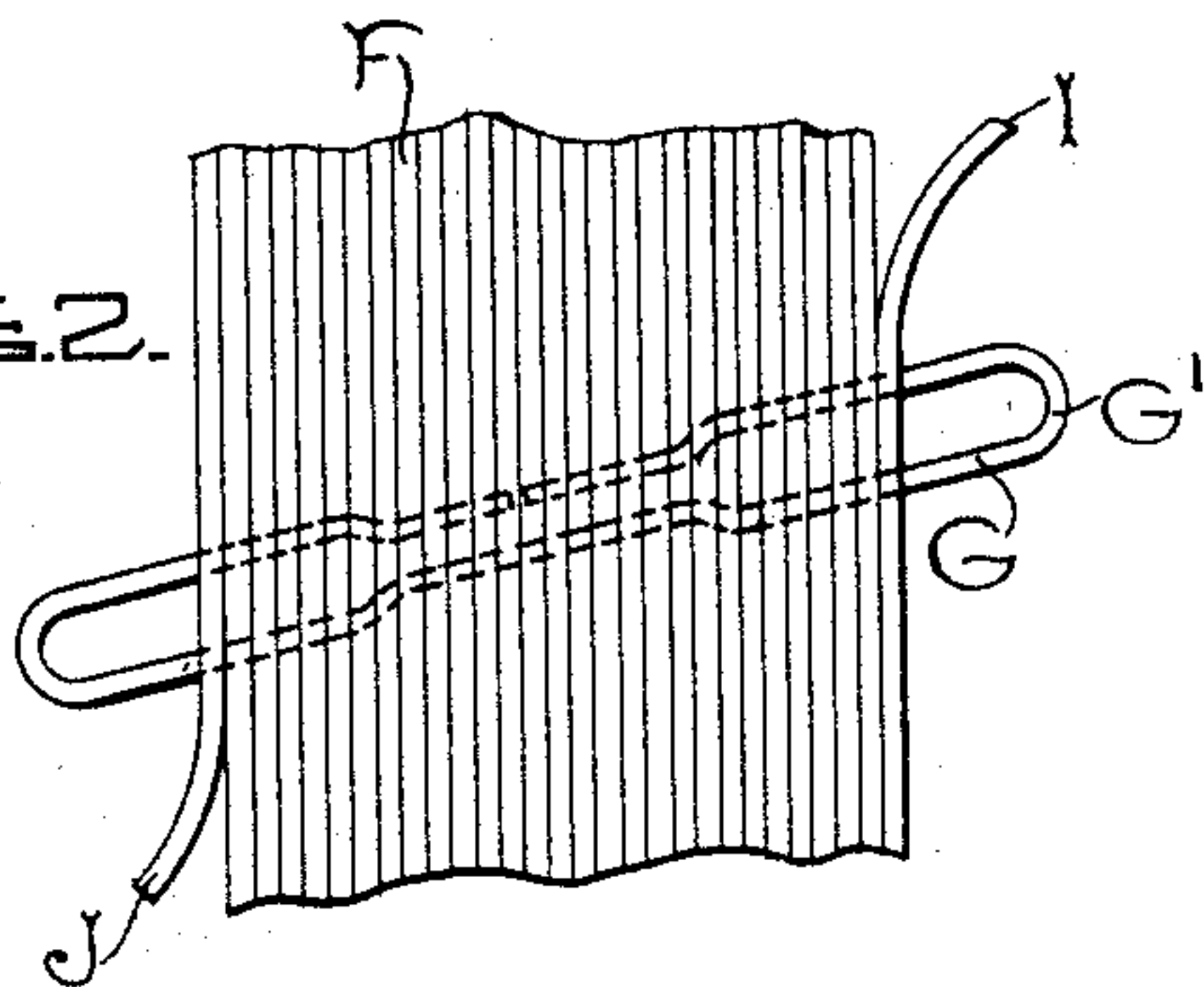
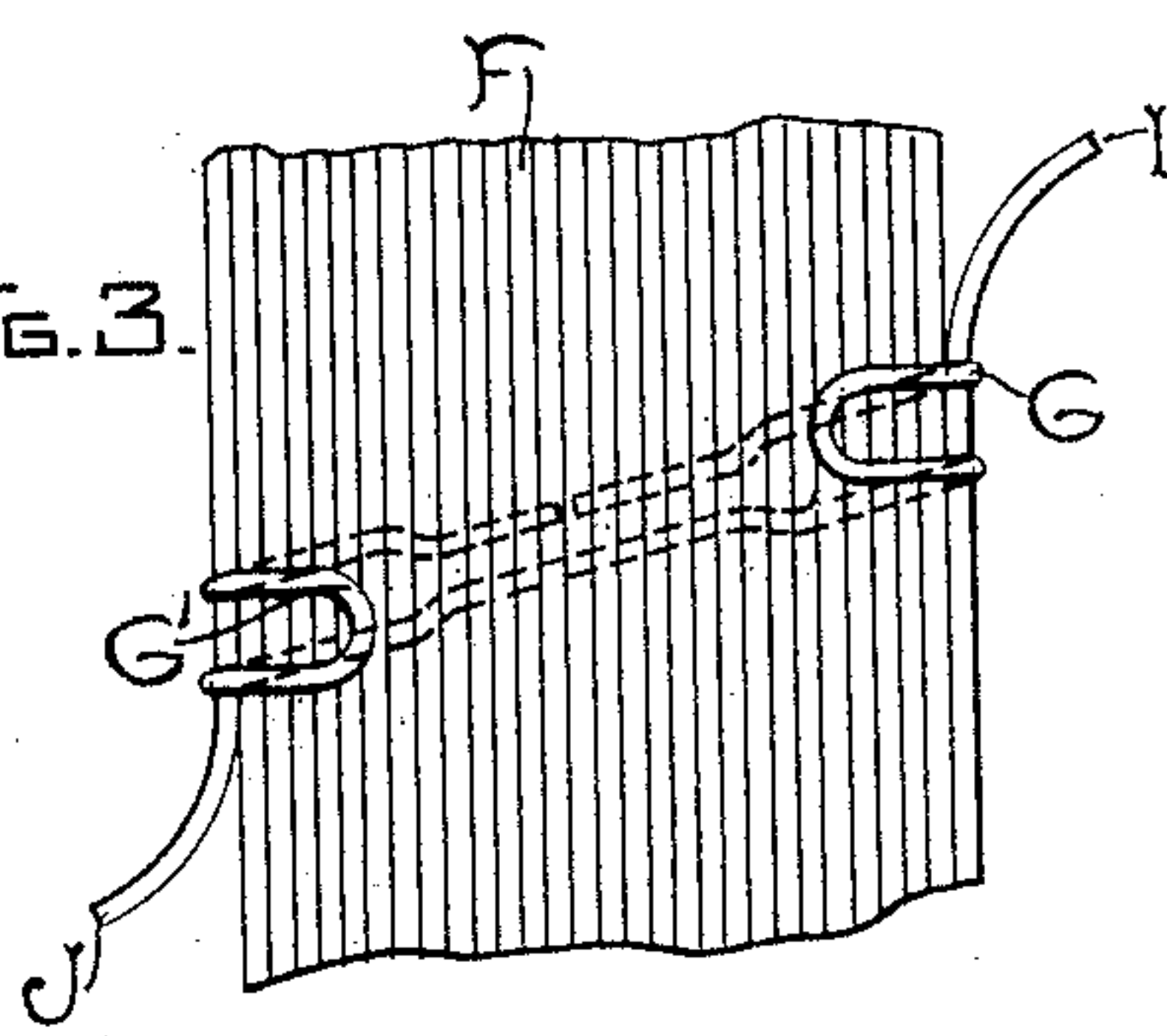


FIG. 3.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

JOHN R. GRINDROD, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

## RETAINING-BAND FOR COMMUTATORS.

SPECIFICATION forming part of Letters Patent No. 619,299, dated February 14, 1899.

Application filed November 5, 1898. Serial No. 695,532. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN R. GRINDROD, a subject of the Queen of Great Britain, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Retaining-Bands for Commutators, (Case No. 886,) of which the following is a specification.

In a prior patent, No. 614,462, granted November 22, 1898, I have shown and described a commutator composed of a plurality of segments, each segment insulated from the adjacent segments by mica or other insulating material, and the whole secured by a temporary binding-band of wire, the wire being soldered in one or more places to hold it in place.

My invention has for its object the improvement of the construction of the wire retaining-band; and to this end it consists in the means employed to retain the band in place.

In the accompanying drawings, which illustrate my invention, Figure 1 is a perspective view of a commutator provided with a wire retaining-band. Fig. 2 is a detail view showing the mechanical clamp during the process of winding the band, and Fig. 3 is also a detail and shows the second step in the process of securing the band in place.

The commutator is composed of any desired number of segments A, which are of any suitable shape and are insulated from each other by pieces of mica or other insulating material B. In the present instance each segment is provided with an inwardly-extending lug or extension C, which is used in clamping it to a suitable shell or support; but the shape and arrangement of the clamping means for each segment are immaterial. In addition to this each segment is provided with an ear D, to which the commutator-leads may be secured in any well-known manner.

The commutator-segments may be assembled in any desired manner, since this feature forms no part of my invention. After the segments are properly assembled, with insulation between the segments, the inner surfaces are finished and the commutator as a whole mounted on a dummy-shell or other support. The outer surface may then be finished wholly or in part, after which a band of insulating material E is wrapped around

the segments preparatory to winding the binding-band F. This strip of insulating material serves a double purpose: First, it prevents the surface of the segments from being injured by the band during the time it is being wound thereon, and, second, it enables the commutator to be tested after it is assembled. The latter feature is most important, since without it the insulation of the commutator could not be tested until after the commutator was mounted on the machine for which it was intended. The wire retaining-band is composed of a number of turns of wire, the number of turns and the size of the wire depending upon the size of the commutator and the strain on the several segments. In winding the band on the commutator a piece of fiber or other suitable material H is placed on the surface of the band E and is arranged to form the seat for the mechanical clamp G. The object in placing the additional strip H on the commutator is to prevent the segments under the clamp from being forced inward more than the adjacent segments when the band is applied, thereby making a low spot on the commutator. I have found it desirable to place the strip H at an angle to the plane of the segments, so that it will extend over several of them and thus distribute the pressure. In the present instance four of the segments are wholly or partially covered by the clamp, as I have found this to be a satisfactory arrangement; but this number may be added to or subtracted from, as desired, without departing from my invention.

The mechanical clamp G as first formed consists of a single piece of wire bent so as to have two rounded ends or loops G', as shown in Fig. 2. This arrangement is a desirable one, since the joint in the wire when the band is wound in place is under the band. I have shown the clamp made of wire; but it is evident that a strip of brass or other suitable metal could be employed and the strip disposed as shown in the drawings.

In winding the band the commutator is mounted in a lathe or other winding-machine, and one end of the wire is temporarily secured to the ear of a segment. The commutator is then rotated until a sufficient number of turns of wire have been mounted thereon,



the wire being of course kept under suitable tension. As soon as the required number of turns have been wound in place, as shown in Fig. 2, the rounded ends G' of the clamp G are bent so that they grip the outer turns of the wire and hold them in place, after which the end of the wire is loosened from the reel and the last turn cut from the wire-reel. This leaves the commutator in such shape that the wire will hold the segments temporarily; but to finish the joint the end I of the wire band is given a complete turn around the right-hand end of the mechanical clamp, thence across the band to the left-hand end of the clamp, which prevents the wires forming the band from separating, and is completed by being given a turn around the left-hand end of the clamp. Prior to giving the final turn to the end I of the wire the opposite end J of the wire is given a complete turn around the left-hand end of the clamp G and then passed across the band and given a turn around the right-hand end of the clamp, after which the ends G' of the clamps are hammered down, as shown in Fig. 1. The hammering down of the ends of the clamp makes offsets therein, which offsets and ends serve to clamp the wire securely.

To prevent the clamp from shifting from its diagonal position, the wires forming the band are hammered down on each side of the clamp, as shown at K. This securely locks the clamp and at the same time slightly increases the tension on the band.

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

1. As an article of manufacture, a plurality of commutator-segments assembled in annular form and wholly or partially finished and provided with a wire retaining-band, and a mechanical clamp for securing the ends of the wire which is disposed at an angle to the plane of the segments so as not to unduly compress the segments at that point.

2. As an article of manufacture, an assembled commutator wholly or partially finished, having a surrounding strip of insulation, a wire retaining-band wound over the insulation, a mechanical clamp mounted on a supporting-strip placed at an angle to the plane

of the segments, and the ends of the wire band secured to the clamp and extending across the face of the band.

3. As an article of manufacture, an assembled commutator wholly or partly finished, having a wire band for retaining the segments in place, a mechanical clamp for holding the wire in place, comprising a piece of metal which extends across the face of the commutator between the wire and the segments, and has a portion of both ends of the wire retaining-band wrapped around each of its ends.

4. As an article of manufacture, an assembled commutator wholly or partially finished, having a wire band for retaining the segments in place, a mechanical clamp for holding the wire in place which is disposed at an angle to the plane of the segments, and depressed portions K in the wire band for retaining the mechanical clamp in its angular position.

5. As an article of manufacture, an assembled commutator wholly or partially finished, having a wire band for retaining the segments in place, a mechanical clamp for holding the wire in place, comprising a piece of metal which extends across the face of the commutator between the wire and the segments, and is provided with an offset portion at each end, and around each offset portion is wrapped the end of the band adjacent thereto and also the opposite end of the band.

6. As an article of manufacture, an assembled commutator wholly or partially finished, having a wire band for retaining the segments in place, a clamp composed of a single piece of wire bent so as to have two rounded ends or loops which is situated between the segments and the band, one of said ends being arranged to take most of the strain of one of the ends of the retaining-band, and also to receive the opposite end of the band and thereby prevent the wires forming the band from separating.

In witness whereof I have hereunto set my hand this 2d day of November, 1898.

JOHN R. GRINDROD.

Witnesses:

DUGALD MCKILLOP,  
JOHN MC MANUS.