

No. 891,316.

PATENTED JUNE 23, 1908

R. B. WILLIAMSON.
DYNAMO ELECTRIC MACHINE.

APPLICATION FILED JULY 30, 1906.

Fig. 1

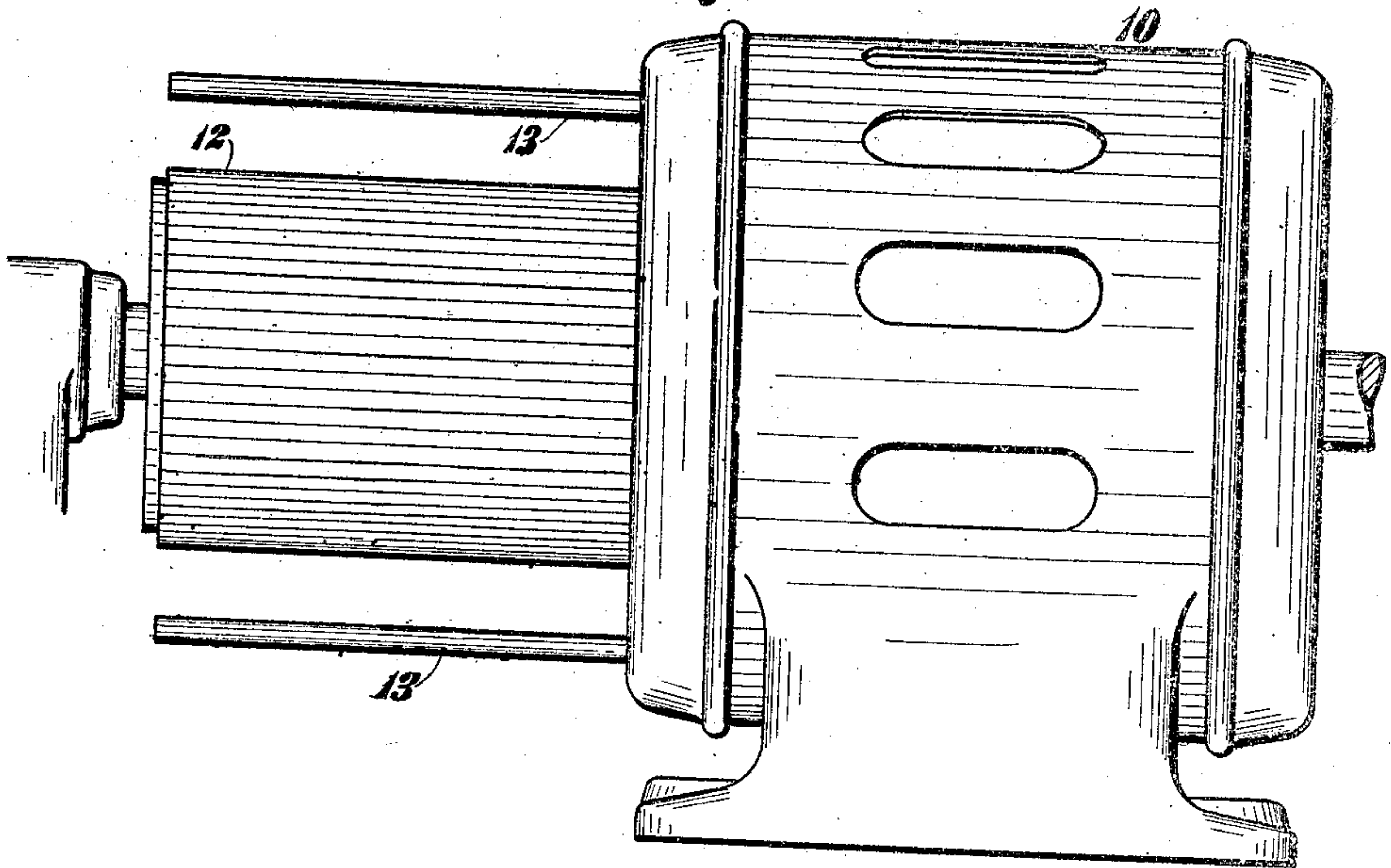


Fig. 2

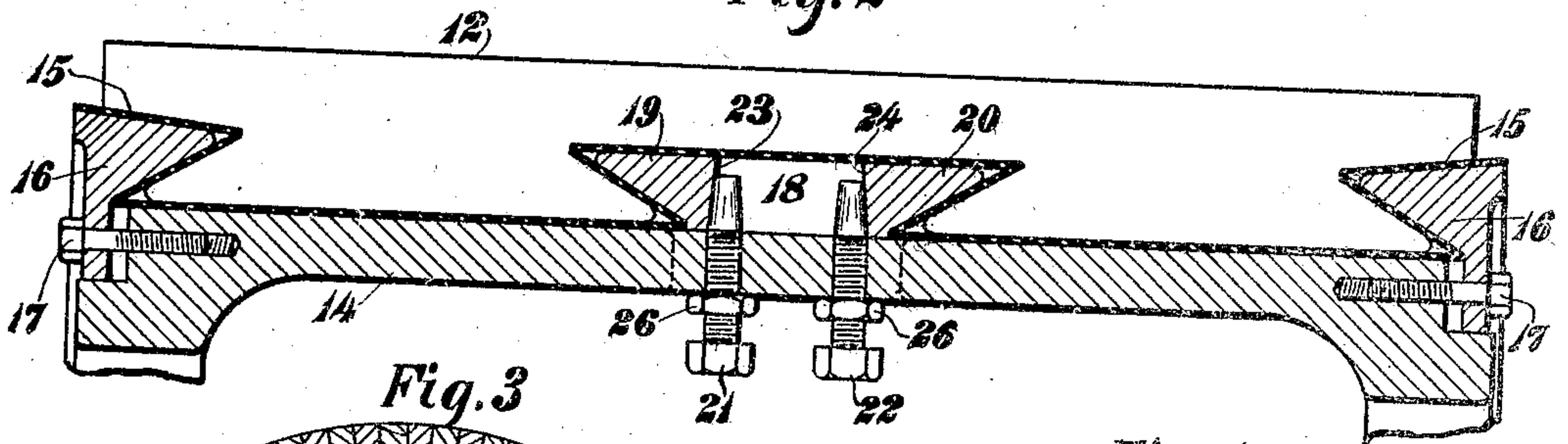


Fig. 3

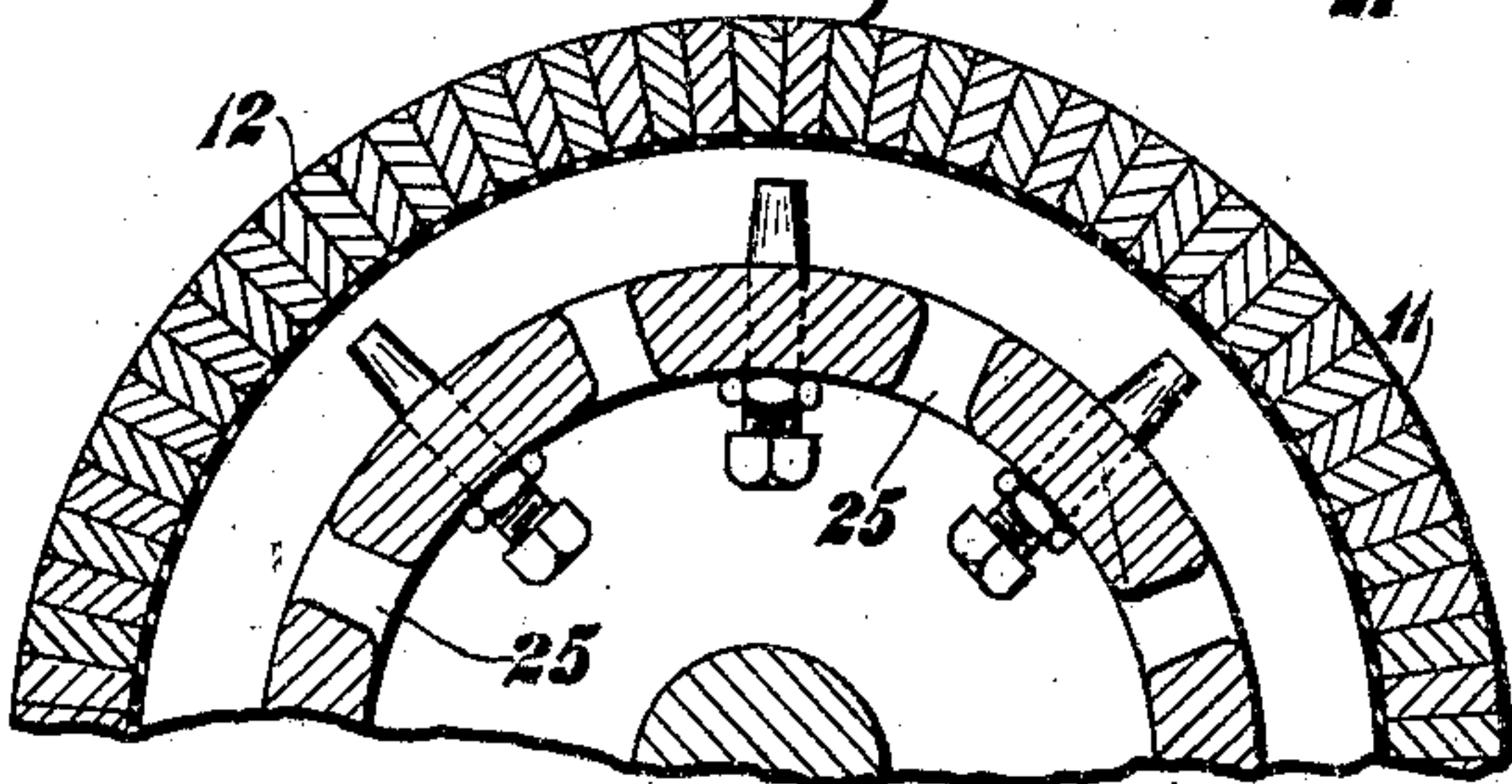
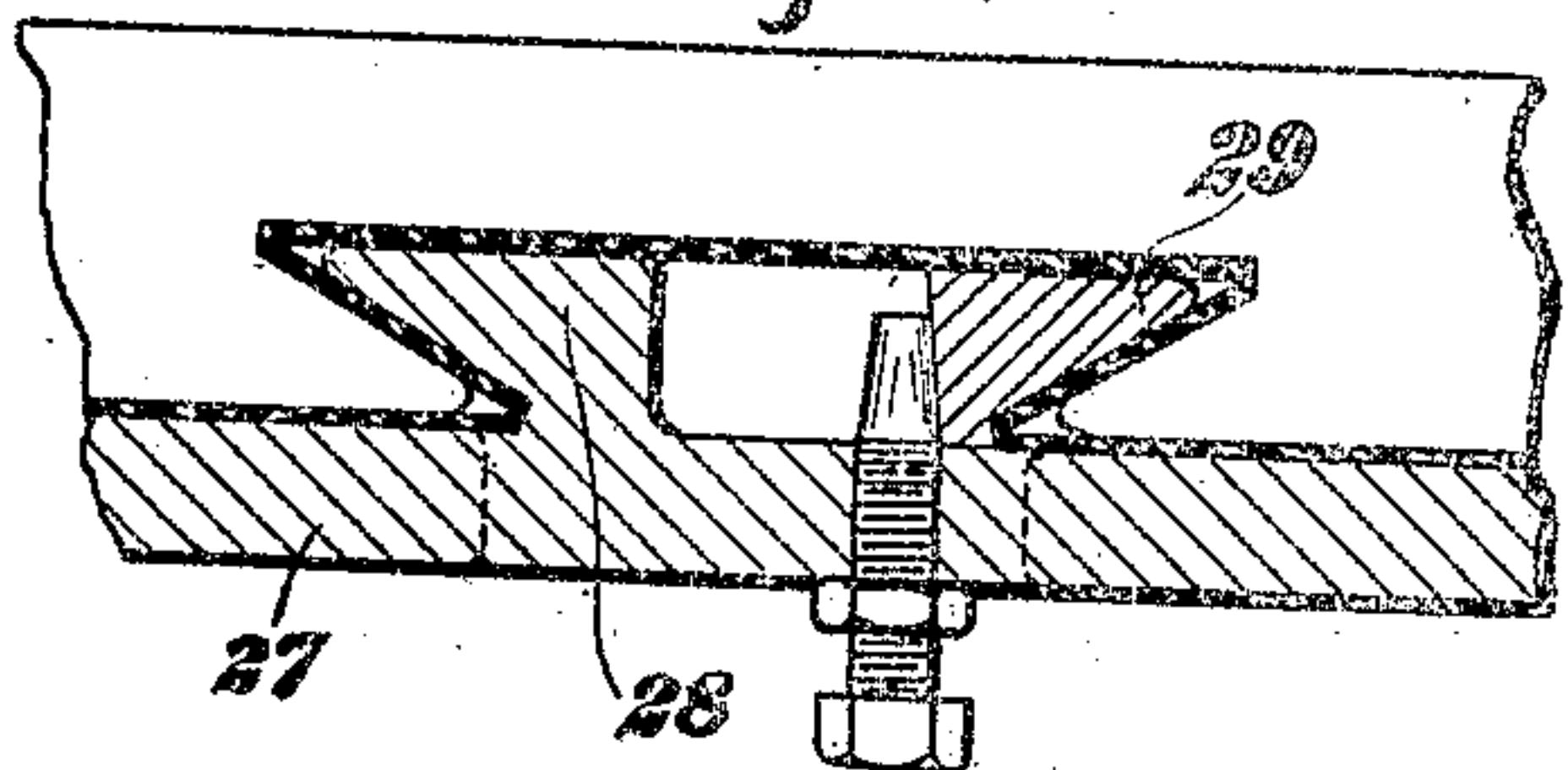


Fig. 4



WITNESSES

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DYNAMO-ELECTRIC MACHINE.

No. 891,316.

Specification of Letters Patent.

Patented June 23, 1908.

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To all whom it may concern:

Be it known that I, ROBERT B. WILLIAMSON, citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Dynamo - Electric Machines, of which the following is a full, clear, and exact specification.

My invention relates to commutators for dynamo-electric machines and particularly for heavy current or high speed machines.

In machines designed for large current output it is necessary to provide long commutators to obtain the proper current carrying capacity. In such machines special means must be provided for holding the segments so that they may not buckle or bend on account of heat expansion. Also in high speed machines such as turbo-generators means must be provided for preventing distortion of the segments due to centrifugal force. To overcome these difficulties it has been proposed to support the segments at the ends and also intermediate the ends, the supports intermediate the ends being arranged either at the inner surface of the segments or around the outer surface thereof. The constructions heretofore employed have not been satisfactory for all purposes chiefly on account of the high cost, the difficulty of assembling and adjusting segments and the increased radial dimensions of the segments and of the commutator. The supports around the outer surface of the segments, which supports are usually shrink-rings are further objectionable for the reason that they cover active surfaces of the commutator and for the reason that on account of the proximity of the rings to the brushes, there is danger of flashing.

The object of my invention is to provide for machines of large current output or high speeds, a commutator construction, the segments of which are supported intermediate their ends, which is inexpensive and so designed that the segments can be easily assembled, adjusted or removed without necessitating an increase in the proportions of the segments.

My invention consists in the details of con-

struction and in the combinations and arrangements of parts described in the specification and set forth in the appended claims.

For a better understanding of my invention, reference is had to the accompanying drawings in which

Figure 1 is an elevation of a machine having a long commutator constructed in accordance with my invention; Fig. 2 is a detail of a commutator segment and the supports therefor; Fig. 3 is a partial transverse section taken through the commutator substantially midway between the ends thereof, the parts being shown on a slightly enlarged scale; and Fig. 4 is a view of a slightly modified intermediate support.

Referring now to the figures of the drawing I have shown at 10 a dynamo-electric machine having a commutator 11 provided with long segments 12, the end and intermediate supports for which are shown in Figs. 2, 3 and 4.

At 13 are shown the brush studs which carry the brush holders, (not shown).

Referring first to Fig. 2 I have shown at 14 a commutator hub or spider on which the segments are mounted, suitable insulation being interposed between the segments and spider. The segments are provided at their ends with V-shaped slots 15 to receive the usual wedge or V-shaped holding or clamping rings 16, which rest on the spider and are adjustably secured thereto by screws 17. Midway between the ends of each segment is an undercut dove-tail or double V-shaped slot 18 adapted to receive two separate and relatively movable V or wedge-shaped holding rings 19 and 20. As shown in this figure both rings are separate from the hub or spider and are adapted to be moved axially along the shaft in one direction to secure the segments in position, and in the opposite direction to permit the segments to be removed. Various means may be provided for tightening and holding in position the rings 19 and 20. In this instance I employ for this purpose two sets of radial tightening screws 21 and 22, the heads of which extend inward beyond the shell of the hub or spider,

and the outer ends of which are inclined or beveled and are adapted to engage inclined faces 23 and 24 of the rings 19 and 20 respectively. The spider is provided between the tightening screws with longitudinal slots 25, the purpose of which will be explained.

In assembling the segments, the screws 21 and 22 are moved inward until the outer ends are flush with or below the surface of the hub and the rings are then moved toward each other until the distance across the tops of the rings is less than the narrowest parts of the dove-tail slots 18 of the segments. The segments are then placed on the spider and secured thereto by tightening the end-rings 16. The intermediate rings 19 and 20 are then spread apart by means of any tool or instrument inserted in the slots 25. The rings are next forced tightly into the V-shaped portions of the slots by means of the radial tightening screws 21 and 22. By means of the check nuts 26, the screws and rings are held securely in position.

In Fig. 4 I have shown a slight modification of my invention, the hub 27 is provided with an integral V-shaped flange 28 similar in shape to one of tightening rings in the first described construction, and a movable V-shaped tightening ring 29. The segments are assembled by moving the ring 29 toward the flange 28 until the distance from the tip of the flange to the tip of the ring is less than the narrowest part of the dove-tail slot. In this case the segments must be moved longitudinally until the V-shaped flange engages the corresponding V-shaped slot in the segment. The ring 29 is then moved firmly into position as in the first construction.

The constructions shown are effective, simple, and inexpensive, and the segments can be assembled and tightened without difficulty. Since the segments are provided with dove-tail slots to receive the intermediate supports, less copper is required than in the construction in which the segments are provided with dove-tail projections extending inward beyond the body of the segments, and also the commutator can be made of less diameter. It also avoids the use of shrunk-on steel rings on the active surface of the commutator.

I do not wish to be confined to the exact details shown but aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent is:—

1. In a dynamo-electric machine, a commutator support, commutator segments resting thereon substantially throughout

their length, said segments having undercut slots intermediate their ends, clamping means at the ends of the segments, a continuous clamping member in said slots, and means for shifting said member axially independently of the end clamping means.

2. In a dynamo-electric machine, a commutator support, commutator segments mounted thereon, said segments having undercut dove-tail slots intermediate their ends, clamping means at the ends of the segments, clamping rings in said undercut slots, and means for spreading said rings to tighten them in position independently of the end clamping means.

3. In a commutator, a hollow support, commutator segments mounted thereon, clamping means intermediate the ends of the segments, and means for shifting said clamping means from the interior of the support.

4. In a commutator, a hollow hub or spider, commutator segments mounted thereon, said segments having undercut slots intermediate their ends, a clamping ring in said slots tending to force each segment at a point intermediate its ends toward said hub or spider, and means for shifting said ring comprising adjusting devices extending through the wall of the hub or spider.

5. In a commutator for dynamo-electric machines, a hub or spider, segments mounted on said hub, means for supporting the segments at their ends, said segments having undercut slots intermediate their ends, a clamping ring surrounding the hub and adapted to fit into said slots, and radial means engaging said ring for forcing the latter axially into the slots.

6. In a commutator for dynamo-electric machines, a hub or spider, segments mounted on the hub, means for supporting the segments at their ends, means for supporting the segments intermediate their ends comprising a pair of movable rings, said intermediate supporting means being independent of the end supporting means, and means for moving said rings axially away from each other.

7. In a commutator for dynamo-electric machines, a hub or spider, segments mounted on the hub or spider and supported at their ends, means independent of the end supporting means for supporting the segments intermediate their ends comprising two axially movable rings, said rings being located in undercut slots in the segments, and means for moving said rings axially away from each other.

8. In a commutator for dynamo-electric machines, a hub or spider, segments mounted thereon, means for supporting the segments intermediate their ends comprising an axially

movable clamping ring, and a plurality of radial bolts or screws for moving said ring.

5 9. In a commutator for dynamo-electric machines, a hub or spider, segments mounted thereon, means for supporting the segments at their ends and intermediate their ends, said intermediate clamping means comprising two relatively movable clamping rings,

and radial screws or bolts mounted in the hub for adjusting the rings.

10 In testimony whereof I affix my signature, in the presence of two witnesses.

ROBERT B. WILLIAMSON.

Witnesses:

ARTHUR F. KWIS,
FRED J. KINSEY.