No. 789,917. PATENTED MAY 16, 1905.

W. H. JORDAN.

MACHINE FOR GRINDING COMMUTATORS OF DYNAMOS OR MOTORS.

APPLICATION FILED AUG. 20, 1904.

4 SHEETS—SHEET 1.

Fig. 1

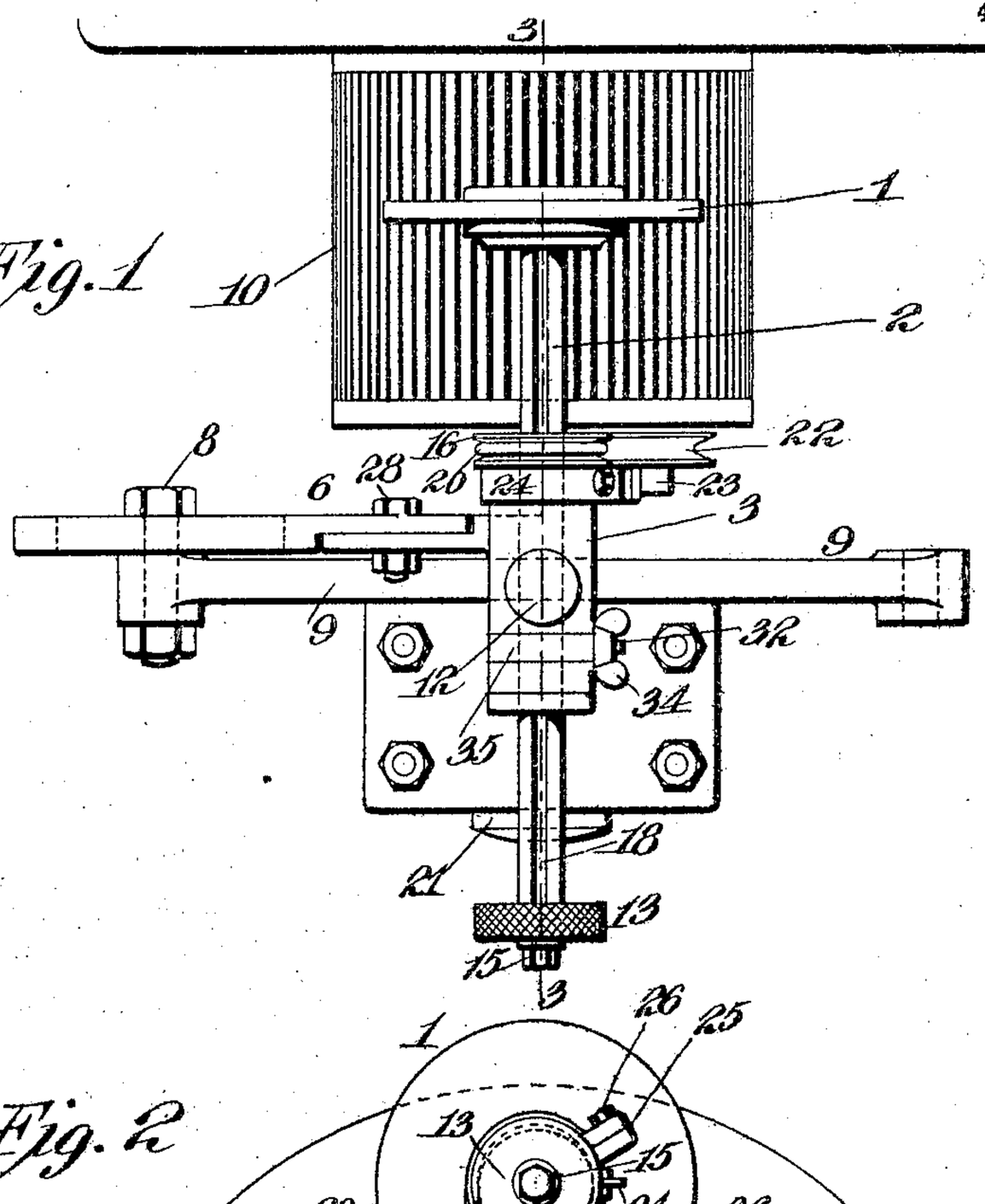
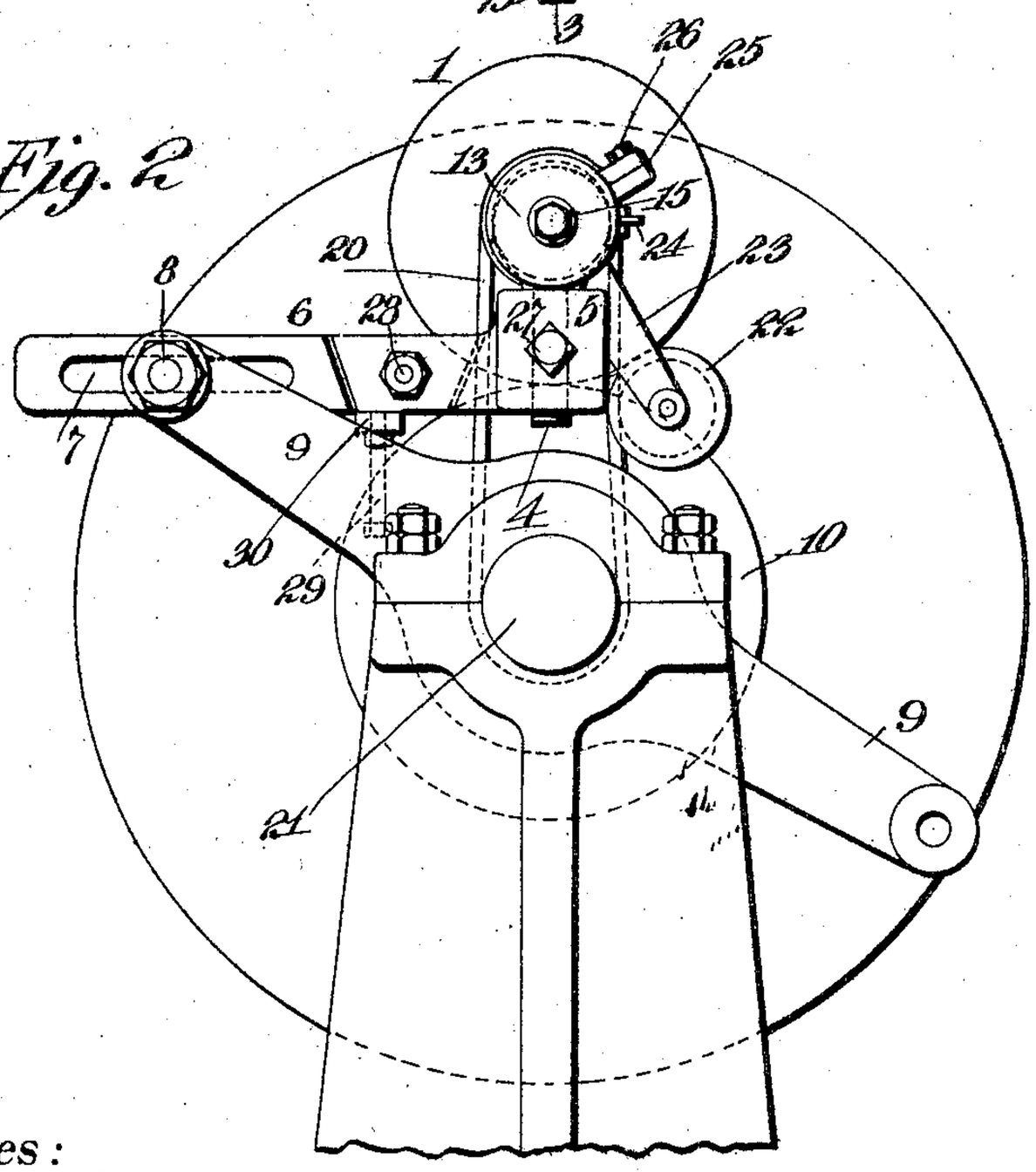


Fig. 2



Witnesses:

Jas. F. Coleman

Jno. Robt. Taylor

Inventor

William H. Jordan

By Dyer & Dyer

Attorneys.

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4 SHEETS—SHEET 2.

Fig. 3

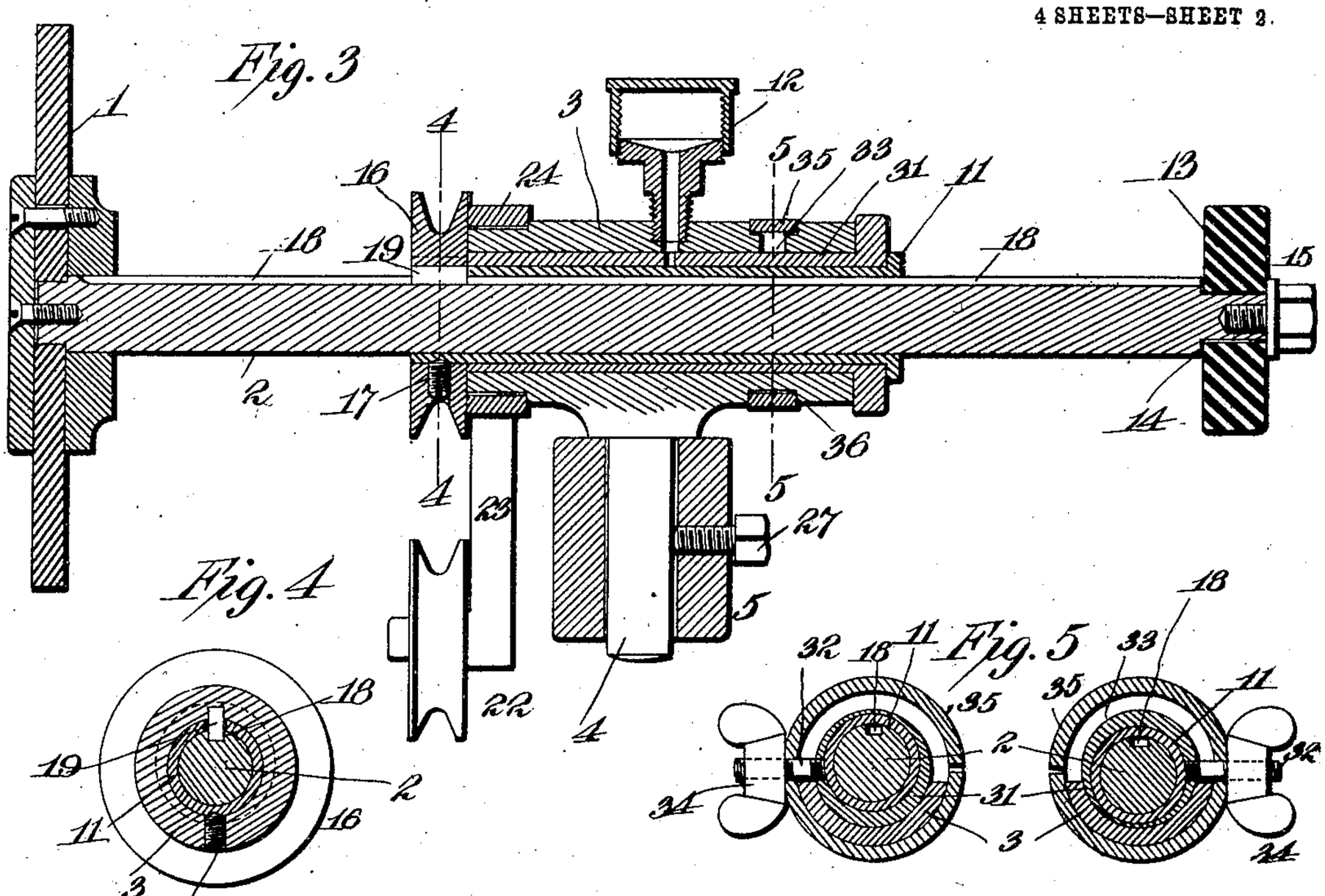


Fig. 4

Fig. 5

Fig. 6

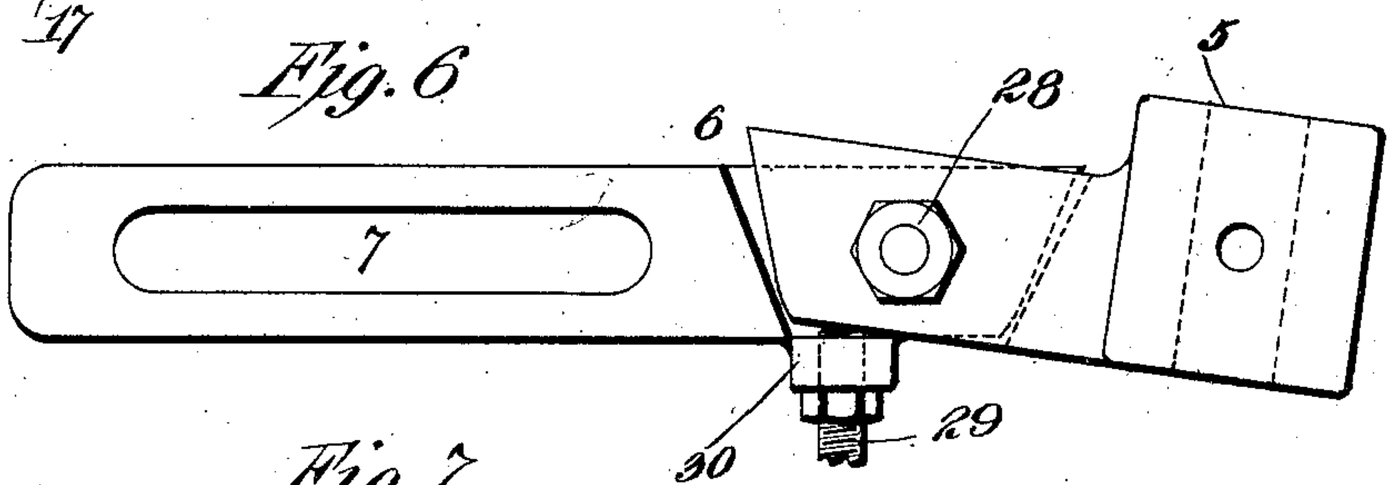


Fig. 7

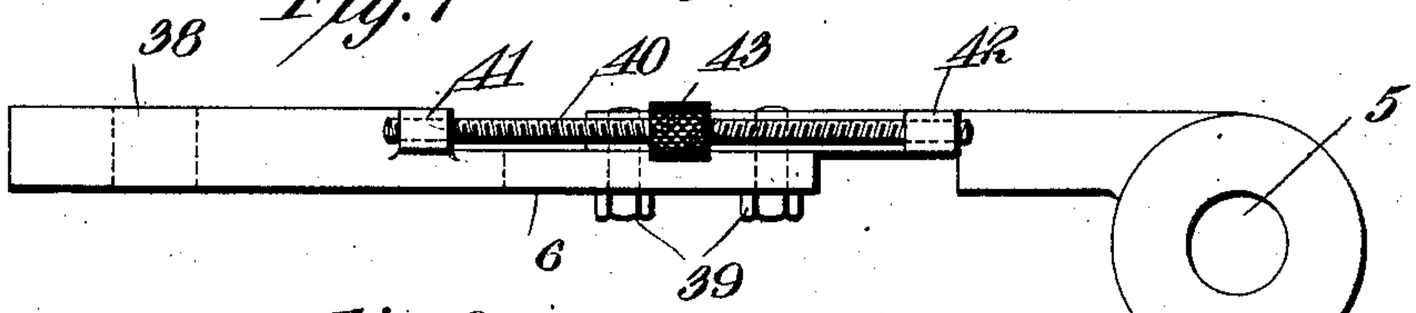
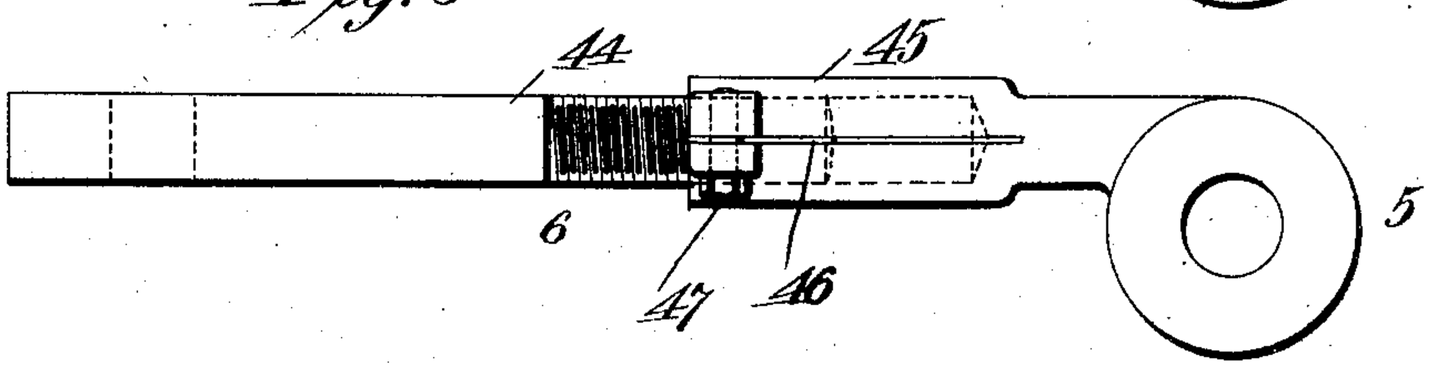


Fig. 8



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4 SHEETS—SHEET 3.

Fig. 9

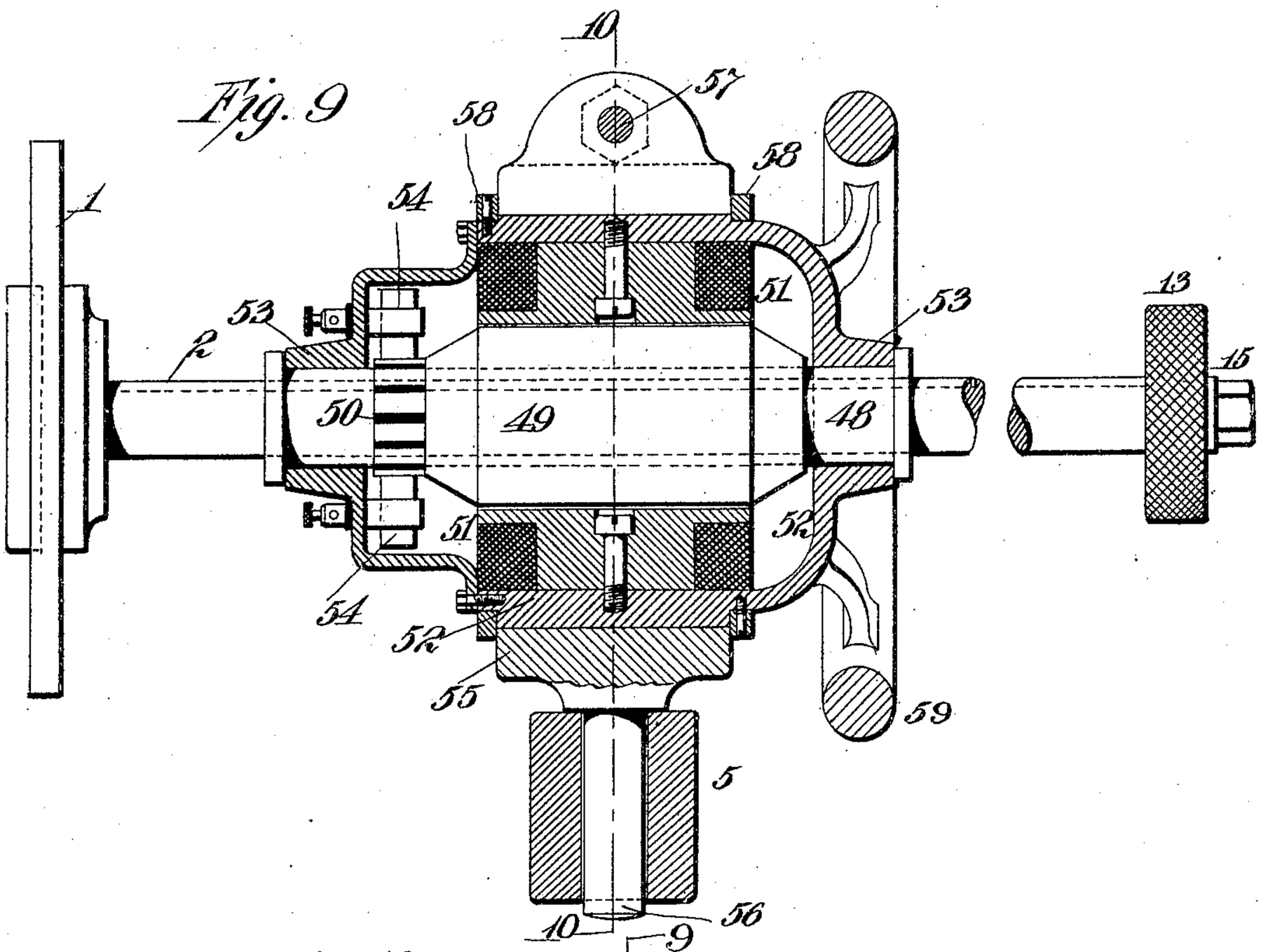
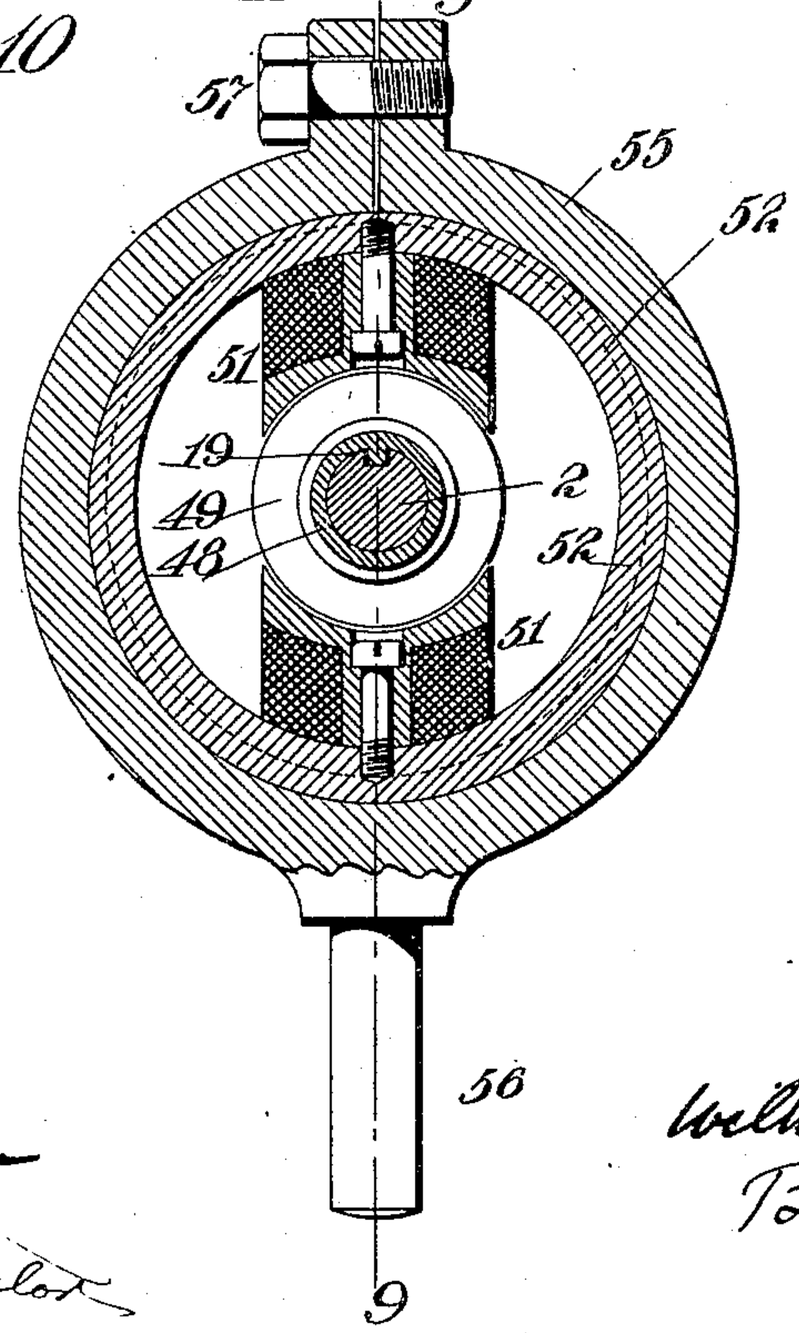


Fig. 10



Witnesses:

Jas. F. Coleman

Dno. Robt. Taylor

Inventor

William H. Jordan

By Dyer & Dyer

Attorneys.

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4 SHEETS—SHEET 4.

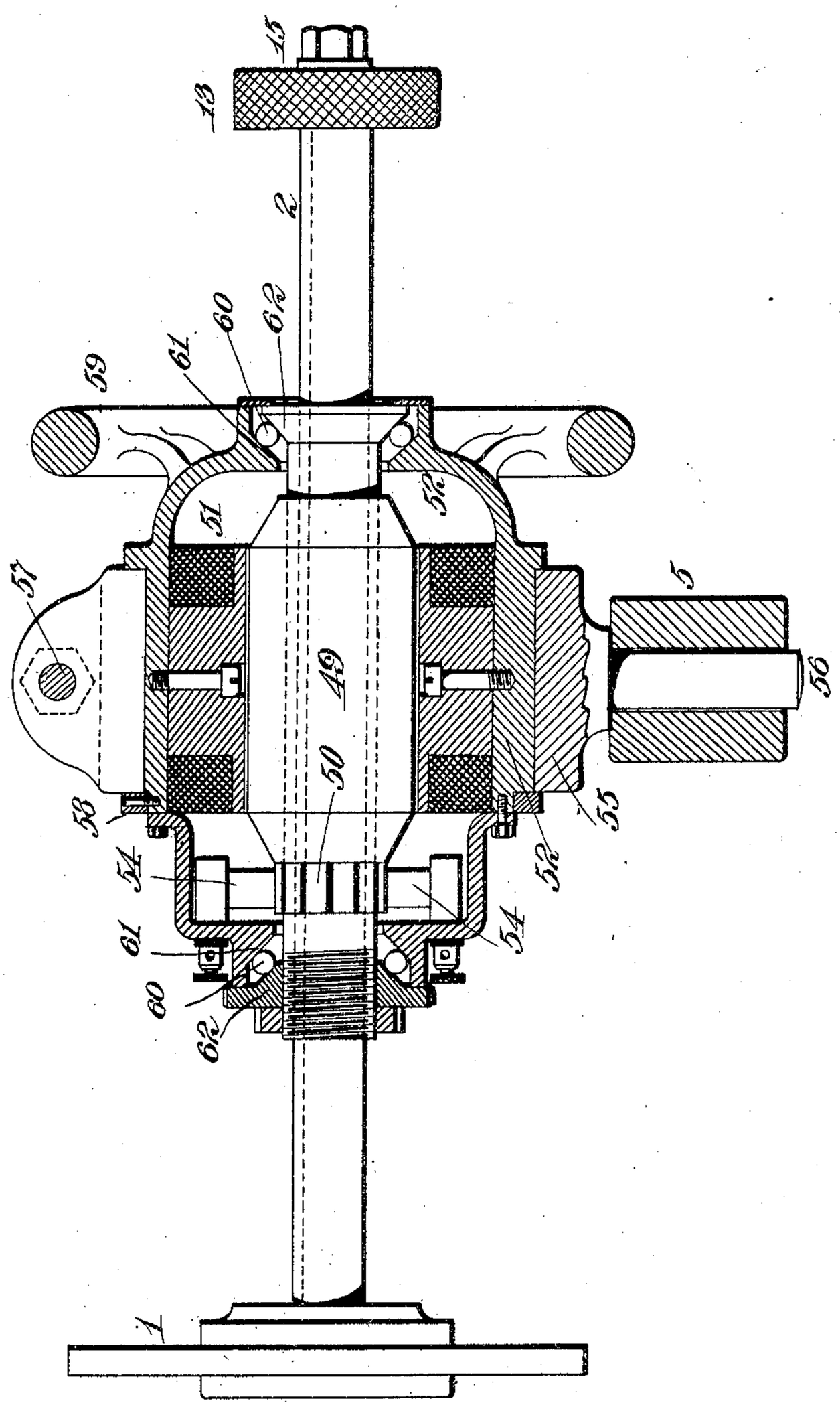

Fig. 1.

Witnesses:

Jas. F. Coleman

Jno. Robt Taylor

Inventor,

William H. Jordan

By Dyer & Dyer

Attorneys.

No. 789,917. Patented May 16, 1905.

UNITED STATES PATENT OFFICE.

WILLIAM H. JORDAN, OF BROOKLYN, NEW YORK, ASSIGNOR OF THREE-FOURTHS TO JOHN F. JORDAN, GEORGE A. JORDAN, AND CHRISTOPHER C. JORDAN, OF BROOKLYN, NEW YORK.

MACHINE FOR GRINDING COMMUTATORS OF DYNAMOS OR MOTORS.

SPECIFICATION forming part of Letters Patent No. 789,917, dated May 16, 1905.

Application filed August 20, 1904. Serial No. 221,568.

To all whom it may concern:

Be it known that I, WILLIAM H. JORDAN, a citizen of the United States, residing in Brooklyn, county of Kings, State of New York, have invented a certain new and useful Improvement in Machines for Grinding Commutators of Dynamos or Motors, of which the following is a description.

The object I have in view is to produce a device for grinding the commutators of motors or dynamos when such become worn without dismantling the dynamo or motor.

Another object is to produce a device which may be readily applied to dynamos or motors of different sizes and designs.

Another object is to produce a device which may be accurately adjusted in the relation to the commutator.

A further object is to produce a device which will be simple and compact and at the same time highly efficient.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a top view of the device applied to a commutator of the dynamo-electric machine. Fig. 2 is an end view of the same. Fig. 3 is an enlarged sectional view of the device, taken on the line 3 3 of Fig. 1. Fig. 4 is a transverse section taken on the line 4 4 of Fig. 3. Fig. 5 shows transverse sections taken on the line 5 5 of Fig. 3, these views representing the device in its extreme positions of adjustment. Fig. 6 is a side view of an adjustable support, as illustrated in Fig. 2. Figs. 7 and 8 are top views of modified forms of support. Fig. 9 is a modified form of device employing an electric motor, the view being partly in section, taken generally along the lines 9 9 of Fig. 10. Fig. 10 is a transverse section of the device, taken on the lines 10 10 of Fig. 9. Fig. 11 is a view similar to Fig. 9 of a modification.

In carrying out my invention I employ a grinding wheel or disk 1, which is supported upon a shaft 2. This shaft is mounted in bearings within a barrel 3. The barrel is provided with a depending standard 4, which enters a socket 5, formed upon an arm indicated generally by the character 6. This arm has a slot 7, through which passes a bolt 8 for attachment to one of the commutator-brush-supporting yokes 9. The grinding-disk 1, in use, is supported above and in engagement with the commutator 10. The shaft 2 passes through the barrel 3 and is provided with a bushing 11, which may be lubricated by means of a grease-cup 12. The shaft 2 passes freely through the bushing and may be moved backward and forward, so as to cause the periphery of the grinding-disk 1 to engage with every part of the surface of the commutator. This shaft is moved, preferably, by means of a handle 13, which is in the form of a disk, of insulating or other suitable material, and which surrounds the shaft 2 and bears against a shoulder 14 formed thereon. A washer and bolt 15 holds the handle in place, yet allows the shaft to freely rotate within it.

In order to rotate the shaft 2, so that the disk 1 will have a grinding action upon the commutator, a pulley 16 is provided. This pulley is keyed upon the bushing 11 by means of a set-screw 17. The shaft 2 is provided with a keyway 18, which engages with a key 19, carried by the bushing 11 and by means of which it will be rotated, but will be slidable within the bushing. A belt 20 connects the pulley 16 with the shaft 21 of the dynamo, and thereby imparts rotary motion to the shaft 2. In order to tighten the belt, if necessary, an idle pulley is provided, this pulley being carried by an arm 23, carried on the sleeve 24, which surrounds the barrel 3. This sleeve is split, as shown at 25, and is provided with a lock-bolt 26, so that it can be clamped in any position upon the barrel to impart any desired tension to the belt.

The barrel 3 may be adjusted as to height in a number of ways. It is provided with an adjusting-screw 27, which passes through a threaded opening in the socket 5 and adjusts the standard 4 at any height. To attain a further adjustment, the arm 6 may be made in two parts, as shown in Figs. 1, 2, and 6, the two parts being connected together by a

bolt 28, so that the angle of the two may be varied. A bolt 29, passing through a threaded projection on one of the parts, engages with the other and by means of which the angular relation of the two parts may be adjusted.

In order to get a finer adjustment of the shaft 2 and disk 1 in relation to the commutator 10, I provide the following mechanism: The bushing 11 is surrounded by an eccentric-sleeve 31. This eccentric-sleeve makes a close fit with the bushing 11 and the inside of the barrel 3. The eccentric-sleeve is shown in section in Fig. 5, and it consists of a cylindrical tube having a bore or central opening disposed to one side of the center. The eccentric-sleeve 31 may be partially rotated and by such partial rotation will impart lateral movement to the bushing 11 and shaft 2. In order to rotate the eccentric-sleeve, it is provided with a pin 32, which passes through a slot 33, formed in the barrel 3. The projecting end of the pin may be used as a handle for rotating the eccentric-sleeve. In order to removably secure the sleeve in any desired position, the pin 32 is threaded and provided with a thumb-nut 34, which engages against the barrel 3.

A ring 35 is provided for covering the slot 33 and preventing entrance of dust and dirt to the space between the eccentric-sleeve and the barrel. The ring 35 is preferably made of elastic metal and has a central opening, through which is passed the pin 32. The ring is made of elastic metal, so that it may be sprung over the barrel 3. In order to form a firm bearing for the ring and keep it in position, the barrel may be cut away at 36 on both sides of the slot 33.

The operation of the device above described is as follows: The brushes are removed from the dynamo and the arm 6 attached to the yoke 9 by means of the bolt 8. By means of the slot 7, the bolt 28, and the adjustability of the standard 4 within the socket 5 the shaft 2 may be made exactly parallel with the shaft 21 of the dynamo. The periphery of the grinding-disk 1 is adjusted in relation to the commutator. The belt 20 being attached and given the proper tension, the dynamo is started. This will have the effect of rotating the disk 1 in the same direction as the commutator. Consequently the abutting surfaces of the commutator and disk will move in opposite directions. The disk is moved over all of the surface of the commutator by the sliding of the shaft 2 within the bushing 11. In order to vary the cut or to more delicately adjust the relation of the disk to the commutator, the eccentric-sleeve 31 may be given a partial revolution. By means of this eccentric-sleeve a very fine adjustment may be secured.

Instead of the slot 7 before described for securing adjustment of the arm 6 the modification shown in Fig. 7 may be employed. In this modification instead of the slot 7 a round or square hole 38 is provided, and the two parts of the arm 6 are arranged to slide one upon the other to vary the length of the arm. The two parts are locked in position by the bolts 39 and accurate adjustment made by means of the rod 40, having the two halves of its length cut with screw-threads of opposite pitch which engage in threaded openings in projections 41 42 on each of the parts of the arm. The rod 40 is provided with a finger-piece 43, by means of which it may be rotated and the length of the arm 6 varied. Another modification is shown in Fig. 8, in which one of the arm-pieces, 44, is provided with threads which engage within a socket formed in the other arm-piece, 45. This socket is split at 46, and the two halves are clamped together by a bolt 47, so that the two parts 44 45 may be rigidly locked in position.

Instead of the device described in connection with Figs. 1, 2, and 3 and which employs a belt the device illustrated in Figs. 9 and 10 may be used. In this modification the shaft 2 slides through a bushing 48, upon which the armature 49 and commutator 50 of a motor are mounted. The field 51 of the motor is carried within a cylindrical body 52, carrying bearings 53 53 for the bushing 48 and also the brushes 54. The cylindrical body 52 is mounted within a split ring 55, which is provided with a standard 56, which may enter the socket 5 of the arm 6. In order to secure the fine adjustment in the alinement of the grinding-disk 1 in relation to the armature, the bearings 53 are eccentrically arranged in relation to the periphery of the cylindrical body 52, the walls of the latter being shown as thicker at the bottom than at the top, thus constituting an eccentric-sleeve; but this eccentric effect may be secured in other ways. By rotating the cylindrical body 52 within the split ring 55 adjustment of the center of the armature, and consequently of the shaft 2, in relation to the ring, and therefore in relation to the arm 6, may be varied as desired. The two parts of the split ring 55 are connected together by a bolt 57, so that the cylindrical body 52 may be tightly clamped in any position. Rings 58 58 on the cylindrical casing 52 and on each side of the split ring 55 hold the former against lateral displacement. Secured to one end of the body 52 is a hand-wheel 59, by means of which the body may be rotated within the ring 55.

In lieu of the plain bearings illustrated in Fig. 9 ball-bearings may be used, as shown in Fig. 11. In this view rows of balls 60, mounted in races 61, bear upon the usual cones 62, one of such cones being removable and adjustable for demolishment and adjustment.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for grinding commutators of electrical machines, the combination with a

grinding-disk, a shaft for supporting the disk, bearings for the shaft, and a support for the bearings, of an eccentric for adjusting the bearings in relation to the support and means for adjusting the support in relation to the work.

2. In a machine for grinding commutators of electrical machines, the combination with a grinding-disk, an adjustable shaft for supporting the disk, bearings for the shaft, and a support for the bearings, of an eccentric for adjusting the bearings in relation to the support and means for adjusting the support in relation to the work.

3. In a machine for grinding the commutators of electrical machines, the combination with a grinding-disk, an adjustable shaft for supporting the disk, means for adjusting the shaft, bearings for the shaft, and a support for the bearings, of an eccentric for adjusting the bearings in relation to the support and means for adjusting the support in relation to the work.

4. In a machine for grinding the commutators of electrical machines, the combination with a grinding-disk, an adjustable shaft for supporting the disk, means for adjusting the shaft, bearings for the shaft, and a support for the bearings, of an eccentric for adjusting the bearings in relation to the support, means for adjusting the support in relation to the work, and means for securing the eccentric to the support.

5. In a machine for grinding commutators for electrical machines, the combination with a grinding-disk, a shaft therefor, a bearing for the shaft, an arm for supporting the bearing, the said arm being in two parts, and means for adjusting one part in relation to the other, substantially as set forth.

6. In combination with a commutator and brush-supporting yoke of a dynamo-electric machine, of a grinding-disk, supporting-shaft, and bearings for the shaft, and an arm for supporting the bearings, the said arm being adjustably connected to the yoke, so that the bearings may be moved toward and away from the yoke, substantially as set forth.

7. In a machine for grinding commutators of electrical machines, the combination with a grinding-disk, a shaft therefor, bearings for the shaft, an armature surrounding the bearings, a field surrounding the armature, a cylindrical body supporting the field, and a ring surrounding the body, the armature being eccentrically located within the ring, substantially as set forth.

8. In a machine for grinding commutators of electrical machines, the combination with a grinding-disk, a supporting-shaft therefor, a bushing for the shaft, the said shaft having a keyway, a key on the bushing, an electric motor surrounding the bushing, the said electric motor being eccentrically mounted within its support, substantially as set forth.

9. In a machine for grinding commutators of electrical machines, the combination with a grinding-disk, and a supporting-shaft, a rotating motor therefor, and a support for the motor, the said motor being eccentrically mounted within its support, substantially as set forth.

10. In a machine for grinding commutators of electrical machines, the combination with a grinding-disk, a shaft therefor, bearings for the shaft, a rotating motor, a support for the motor, said support comprising a split ring, and means for locking the split ring to the motor, substantially as set forth.

This specification signed and witnessed this 17th day of August, 1904.

WILLIAM H. JORDAN.

Witnesses:
JNO. ROBT. TAYLOR,
LEONARD H. DYER.