W. H. JORDAN.

MACHINE FOR GRINDING COMMUTATORS OF DYNAMOS AND MOTORS.

APPLICATION FILED SEPT. 2, 1908.

969,633. Patented Sept. 6, 1910.

2 SHEETS—SHEET 1.

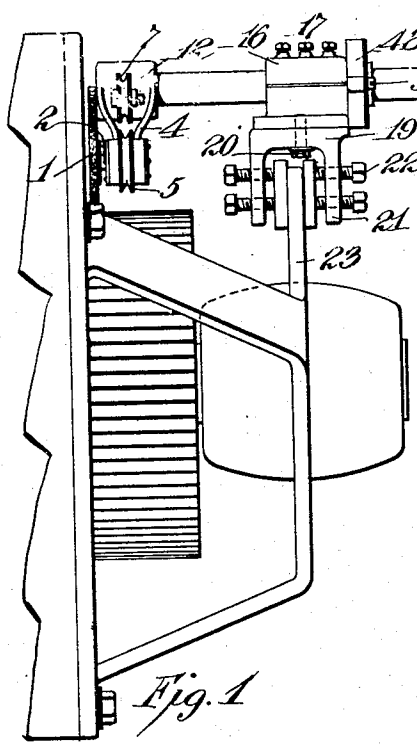

Fig. 1

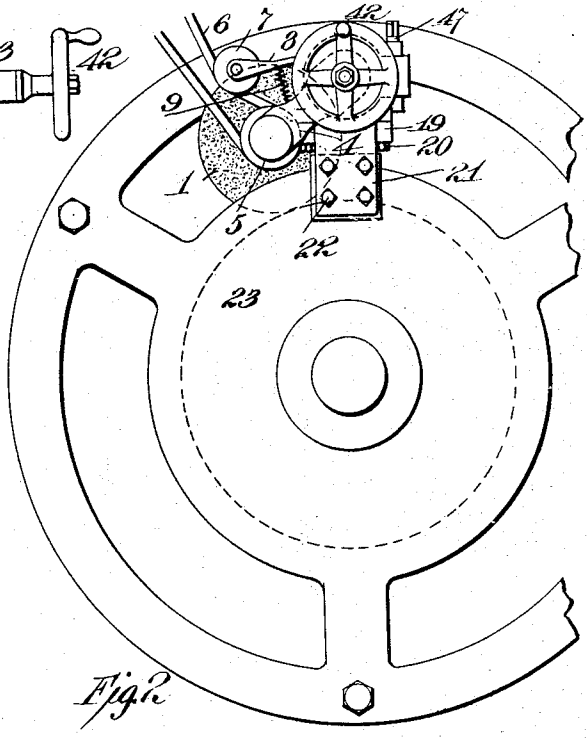

Fig. 2

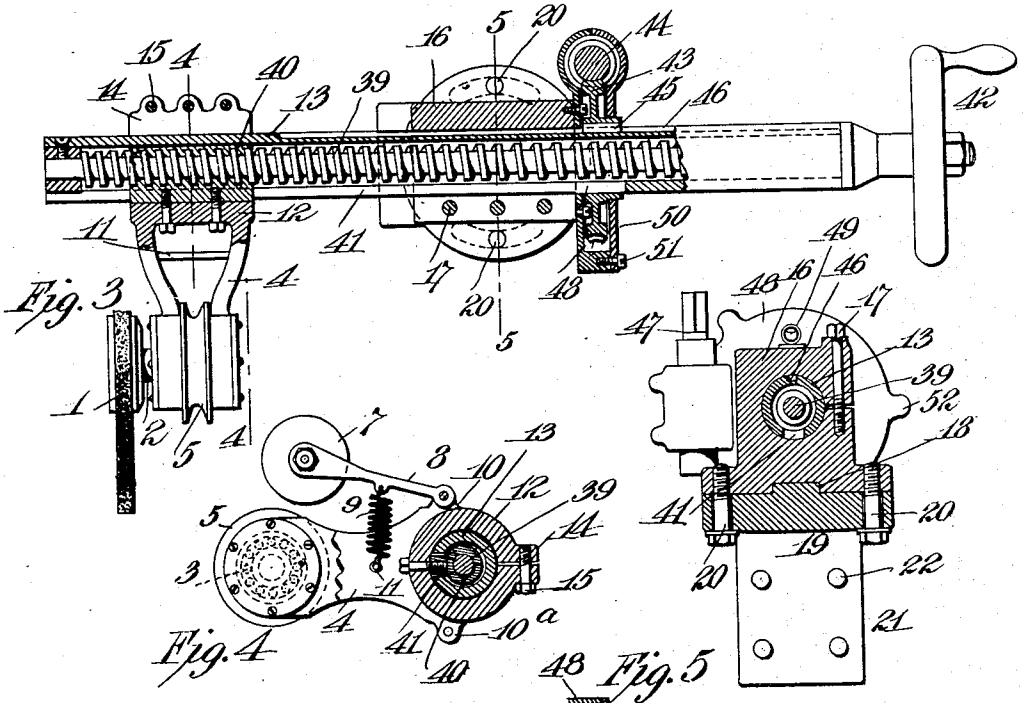

Fig. 3

Fig. 4

Fig. 5

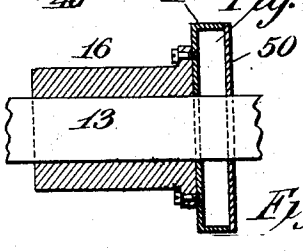

Fig. 5a

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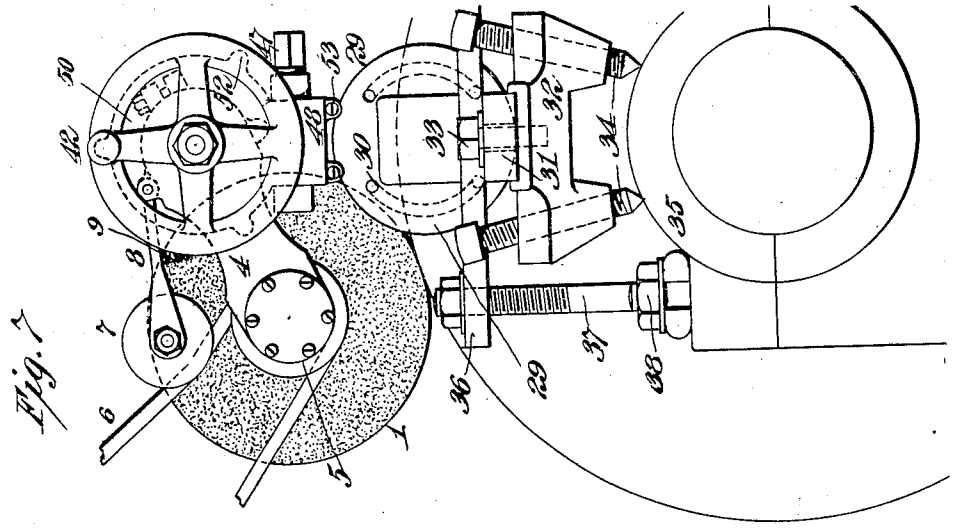

Fig. 7

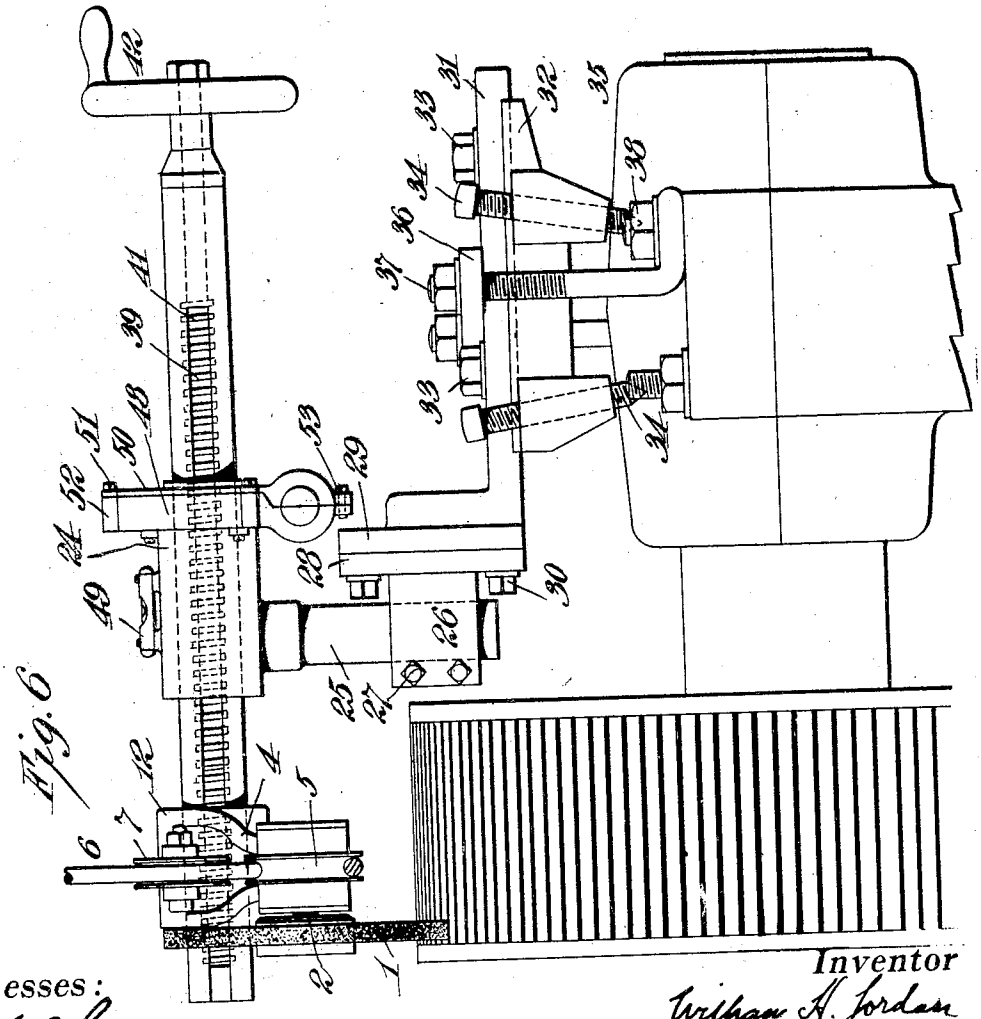

Fig. 6

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UNITED STATES PATENT OFFICE.

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MACHINE FOR GRINDING COMMUTATORS OF DYNAMOS AND MOTORS.

969,633. Specification of Letters Patent. Patented Sept. 6, 1910.

Application filed September 2, 1908. Serial No. 451,383.

To all whom it may concern:

Be it known that I, WILLIAM H. JORDAN, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented a certain new and useful Machine for Grinding Commutators of Dynamos and motors.

The object I have in view is the production of a device for grinding the commutator or other analogous portion of a dynamo or motor, or other electrical machine, when such becomes worn, without the necessity of dismanteling the machine.

Another object is to produce a device which may be readily applied to machines of different sizes and designs and which may be accurately adjusted in relation to the commutator.

Further objects will appear from the following specification and the accompanying drawings, considered together or separately:

Figure 1 is a side view of a portion of an electrical machine showing one embodiment of my invention attached thereto. Fig. 2 is an end view of the same. Fig. 3 is an enlarged sectional view, partly in elevation, of an apparatus embodying my invention removed from the electrical machine. Fig. 4 is a section on the line 4—4 of Fig. 3. Fig. 5 is a section on the line 5—5 of Fig. 3. Fig. 5ª is a sectional view of a modification. Fig. 6 is a side view of a modified embodiment of my invention, and Fig. 7 is an end view of the same.

In all of the views like parts are designated by the same letters of reference.

In carrying out my invention I provide a grinding wheel 1, which is attached to and carried by a shaft 2, which is caused to revolve, making the edge of the wheel engage with the commutator or other object to be ground. Means is provided for moving the edge of the grinding wheel across the face of the commutator and additional means is provided for feeding the edge of the grinding wheel toward the commutator whereby the depth of the cut may be accurately regulated. The shaft 2 is mounted in Hess-Bright or other suitable roller or ball bearings 3 shown in dotted lines in Fig. 4. These bearings are carried upon the bifurcated yoke 4, a grooved pulley 5 lying between the forks of the yoke. A belt 6, shown in Figs. 2, 6 and 7, passes around this grooved pulley and leads to a motor or other prime mover (not shown) for imparting motion to the pulley 5, shaft 2 and grinding wheel. A jockey pulley 7 carried upon a pivoted frame 8 is drawn against the belt by means of a spring 9 which thereby imparts tension to it. The frame 8 may be pivoted to either of the ears 10 or 10ª, see Fig. 4, arranged on the top and bottom of the yoke 4. The anchorage of the spring 9 is at 11, midway between the ears 10 or 10ª. By removing the frame 8 from the ears 10 an dsecuring it to the ears 10ª, the structure may be reversed and the jockey pulley made to press upon the other side of the belt.

The body 12 of the yoke 4 is provided with a central opening through which a shaft 13 passes. This shaft is hollow and of circular cross section as shown in Figs. 4 and 5. The body 12 is split and provided with ears 14 through which bolts 15 pass and by means of which the body may be clamped upon the shaft. If it is not desired to clamp it upon the shaft, a shim (not shown) may be introduced between the ears 14 and the bolts 15 set up sufficiently tight but no tighter than to cause the shaft 13 to have a loose fit within the body 12. The shaft 13 is adapted to be held in position parallel to the axis of the rotor of the electrical machine which is being operated upon. The support for the shaft comprises an element having an opening through which the shaft passes, and which may be clamped upon it to hold it in position. This element is modified according to the particular type of electrical machine which is being operated upon. The embodiment illustrated in Figs. 1 and 2 is an electrical machine of the Westinghouse type. The support for the shaft is a block 16, having an opening through which the shaft 13 passes. This block is split at one side of the opening and is provided with bolts 17, see Fig. 5, by means of which the shaft 13 will be clamped to prevent longitudinal movement. The block 16 is provided with a central recess, which receives a central protuberance 18 of a support 19. Bolts 20 attached to the foot of the block 16 pass through curved slots, see Fig. 3, in the flange on the support 19. By slacking up

on the bolts the block 16 may be turned upon the protuberance 18 and the lateral adjustment of the block 16, and the shaft 13 may be varied within close limits. The support 20 is provided with feet 21 through which bolts 22 pass. These bolts 22 engage with blocks on each side of the web 23 of the electrical machine.

When the device is used in connection with a different form of electrical machine, as is shown in Figs. 6 and 7, instead of using the block 16, a block 24 is employed. This block 24 is similar to the block 16 except that instead of having the recess in the bottom and the flange, it has, as shown, a cylindrical stem 25. This stem 25 passes through an opening in a block 26 which block is split and clamped against the stem by bolts 27. The face of the block 26 is provided with a flange 28, which is clamped against a flange 29 by means of bolts 30. The flange 29 is carried upon a foot 31, which is clamped upon a block 32 by means of bolts 33. The block 32 is supported upon legs formed of bolts 34, which rest upon the bearing box 35 of the electrical machine. A bar 36 is secured by bolts 37 across the foot 31. These bolts have bent extremities which are engaged by the nuts 38, which are used for setting up the bearing 35. This means of attachment of the apparatus is similar to that of my co-pending application filed May 6, 1908, Serial No. 437,101. In either construction employed the shaft 13 may be rigidly supported in position with the edge of the grinding wheel in contact with the commutator or other structure to be ground.

For the purpose of moving the grinding wheel longitudinally over the face of the commutator under operation, the following mechanism is employed. This mechanism comprises a threaded shaft 39, which lies within the hollow center of the shaft 13. This shaft engages with a nut 40, also lying within the center of the shaft. To this nut is secured the body 12 which carries the yoke 4. A projection on the side of the nut 40 passes through a longitudinal slot 41 in the shaft 13 and by revolving the threaded shaft 39 the nut 40 may be moved in either direction and with it the body 12 and the appurtenances carried thereby, including the grinding wheel. For the purpose of rotating the shaft 39 a hand wheel and crank 42 at one end of the shaft 13 is provided.

For the purpose of moving the shaft 13 around its central axis to feed the grinding wheel against the work, mechanism which includes a worm gear 43, (see Fig. 3) and a worm 44 is provided. The worm gear 43 surrounds the shaft 13 and is connected therewith by a feather 45, which engages within a keyway 46 in the shaft 13. The worm 44 is mounted on a shaft 47, Figs. 2 and 7, such shaft having one extremity squared for the attachment of a crank or other suitable device for rotating the shaft. The bearings of the shaft 47 are carried in a casing 48 which is bolted or otherwise secured to the block 16, see Fig. 3. The casing 48 entirely incloses the worm gear 43 and therefore holds it in engagement with the worm 44. The casing 48 is provided with a cover 50, (see Fig. 6), secured by bolts 51 to the casing. These bolts pass through ears 52, shown in dotted lines in Fig. 7, while additional bolts 53 at the bottom of the casing secure the casing and cover together below the worm and worm shaft. By removing the bolts 51 and 53 the cover of the casing may be removed and the worm and worm gear exposed. By rotating the shaft 47 the worm and worm gear will be rotated and with them the shaft 13, it being understood that the bolts 17 are not set up so tight that this action will be prevented.

For the purpose of insuring the proper alinement of the shaft 13 the block 16 or 24 may be provided with a spirit level 49. The use of this level reduces the labor of setting up the machine, as electrical apparatus are usually carefully leveled while in use. The parallelism of the shaft 13 and the shaft of the electrical instrument is therefore assured by the leveling of the block 16 or 24.

In Fig. 5ª I have shown a modified arrangement for securing the gear casing to the block 16 or 24. In Fig. 3 I have shown the screws which secure the casing to the block as accessible only from the inside of the gear casing, which arrangement necessitates the removal of the gear case cover 50 and worm wheel 43 to gain access to the screws for the purpose of removing the block 16. In Fig. 5ª I have shown the block as being provided with lugs through which pass the screws for securing the block and casing together. The heads of the screws are outside of the casing so as to be readily accessible and will allow the removal of the block without need of disturbing the gear case or worm wheel.

In accordance with the provisions of the patent statutes, I have described the principle of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is merely illustrative and that the invention can be carried out in other ways.

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

1. A machine for grinding commutators of electrical machines, having a shaft, means for supporting the shaft in parallelism with the shaft of the electrical machine, an arm

on the shaft, a grinding wheel on the arm, and a worm gear for twisting the shaft and regulating the depth of cut of the wheel.

2. A machine for grinding commutators of electrical machines, having a fixed support, a shaft within the support and capable of twisting therein, a worm carried by the support, a worm gear in engagement with the worm and carried by the shaft, an arm on the shaft, and a grinding wheel on the arm.

3. A machine for grinding commutators of electrical machines, having a hollow shaft, a grinding wheel carried thereby, means for supporting the shaft in parallelism with the shaft of the electrical machine, a mounting for the wheel, sliding on the shaft, a screw within the shaft engaging with the mounting, means for rotating the screw to feed the wheel across the work and means for twisting the shaft and regulating the depth of cut of the wheel.

4. A machine for grinding commutators of electrical machines, having a hollow shaft, a support for the shaft holding it parallel with the shaft of the electrical machine, a grinding wheel, a mounting for the grinding wheel sliding on the shaft, a screw within the shaft and in engagement with the mounting, means for rotating the screw for feeding the wheel across the work, a worm gear and means for rotating the worm gear for twisting the shaft to regulate the depth of cut.

5. A machine for grinding commutators of electrical machines, having a shaft, a support for the shaft for holding it parallel with the shaft of the electrical machine, a bearing carried by the shaft support, the said bearing supporting a worm, and a worm gear on the shaft and connected thereto by a feather so that the shaft may be slid longitudinally for large adjustments.

6. A machine for grinding commutators of electrical machines, having a shaft, a grinding wheel supported by the shaft, a support for the shaft holding it in alinement with the shaft of the commutator, a worm gear mounted on a feather on the shaft, a casing surrounding the gear, and being removably secured to the support, and a worm in engagement with the worm gear, the said worm being carried in bearings in the casing.

7. A machine for grinding commutators of electrical machines, having a grinding wheel, a shaft supporting the same means for twisting the shaft to vary the depth of cut of the wheel, a support for the shaft, means for sliding the shaft within its support, and a base and a pivot connecting the base and support.

8. A machine for grinding the commutators of electrical machines, having a shaft, means for supporting the shaft in parallelism with the shaft of the electrical machine, such means comprising a foot, adjustable legs therefor, a face plate on the foot, a block secured to the face plate, a stem secured in the block and a housing for the grinder shaft carried by the stem.

9. A machine for grinding the commutators of electrical machines, having a grinder shaft, means for supporting the grinder shaft in parallelism with the shaft of the electrical machine, such means comprising a foot having adjustable legs resting on a bearing of the electrical machine, a bar resting on the foot, bolts securing the bar to the bolts of the bearing, a face plate on the foot, a block adjustably carried on the face plate, a stem adjustably mounted in the block, and a housing for the grinder shaft carried by the stem.

This specification signed and witnessed this 30th day of August, 1908.

WILLIAM H. JORDAN.

Witnesses:
LEONARD H. DYER,
JOHN L. LOTSCH.