No. 773,930. PATENTED NOV. 1, 1904.

F. B. DUNCAN.

ELECTRIC MOTOR.

APPLICATION FILED MAY 10, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

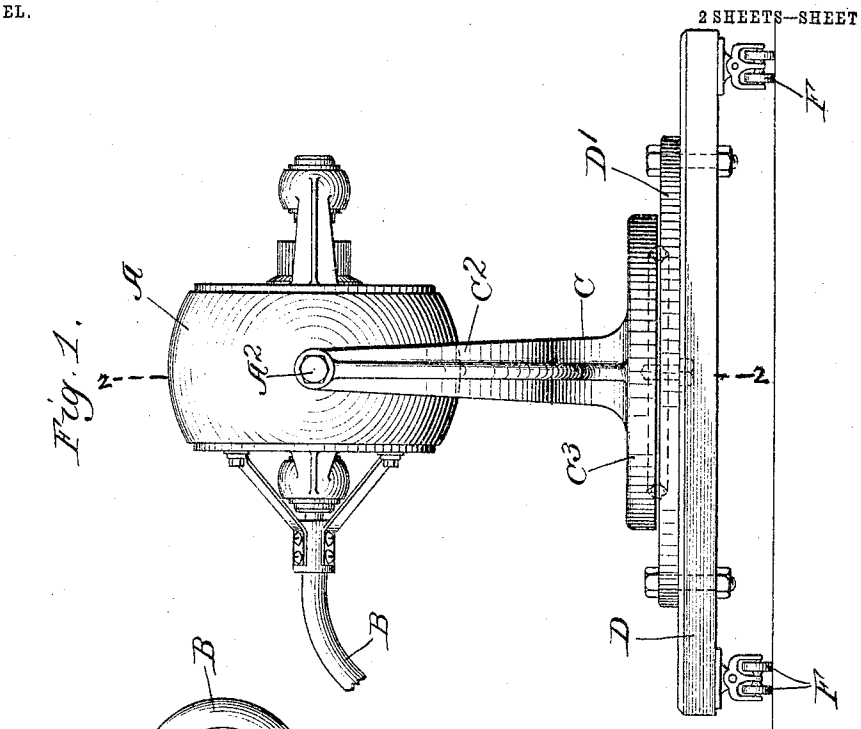
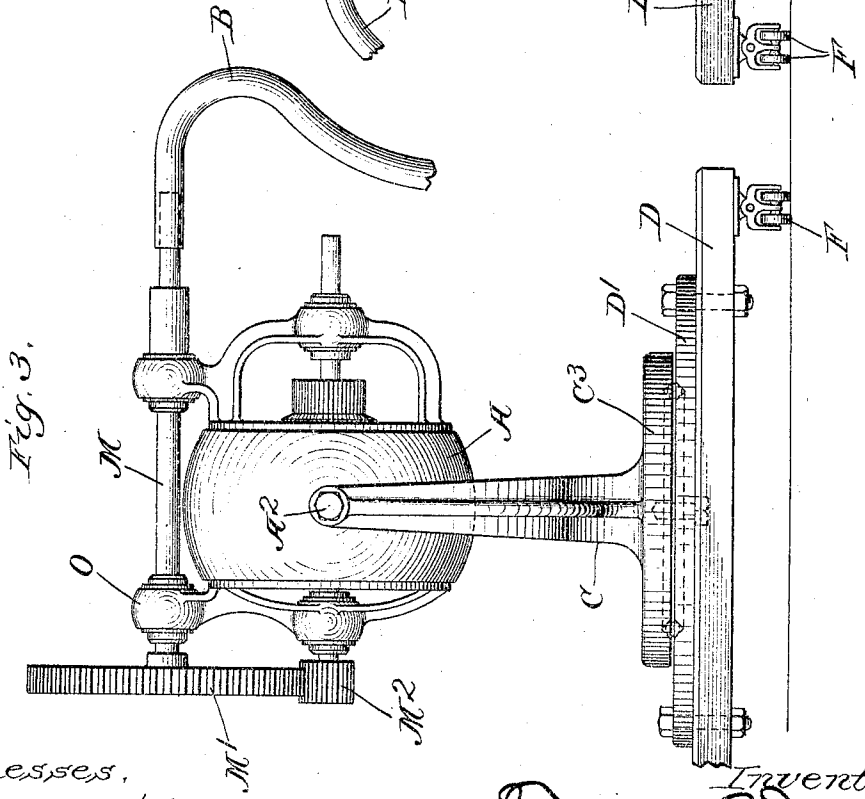


Fig. 3.



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PHOTO-LITHOGRAPHED BY SACHETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

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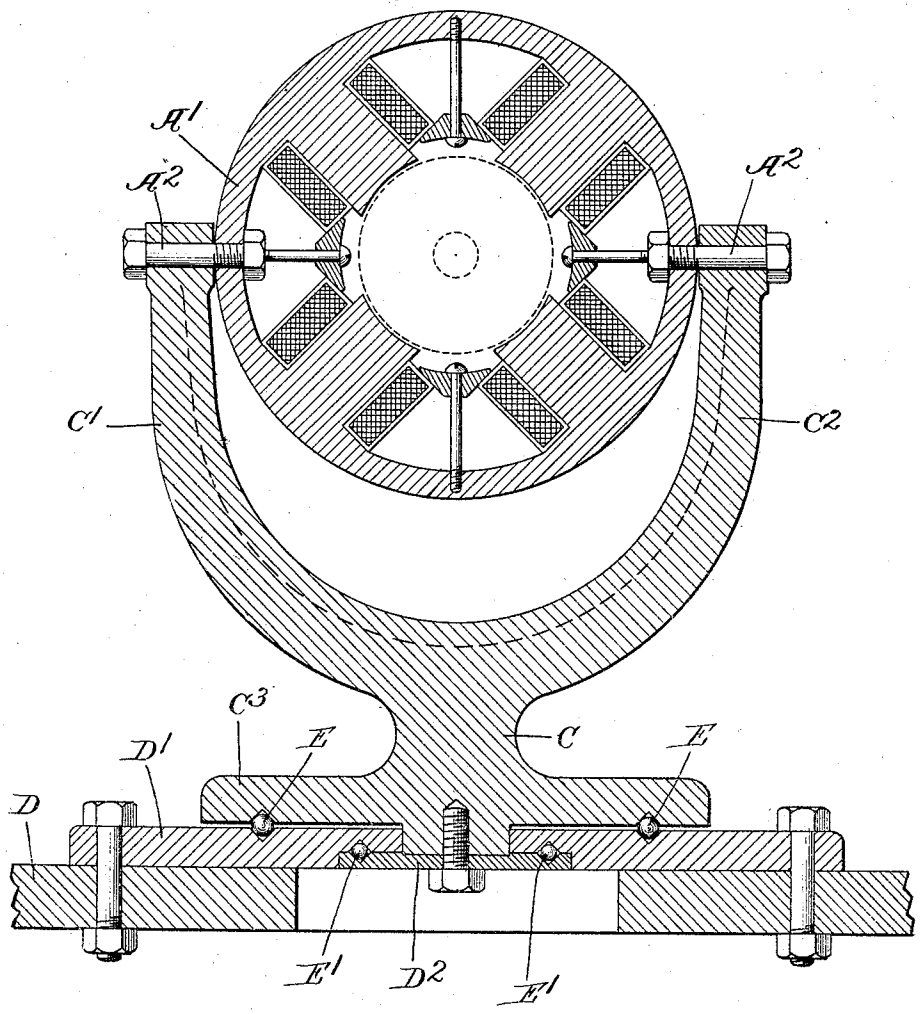
F. B. DUNCAN.

ELECTRIC MOTOR.

APPLICATION FILED MAY 10, 1901.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



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No. 773,930. Patented November 1, 1904.

UNITED STATES PATENT OFFICE.

FREDERICK B. DUNCAN, OF MADISON, WISCONSIN, ASSIGNOR TO NORTHERN ELECTRICAL MANUFACTURING COMPANY, OF MADISON, WISCONSIN, A CORPORATION OF WISCONSIN.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 773,930, dated November 1, 1904.

Application filed May 10, 1901. Serial No. 59,550. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK B. DUNCAN, a subject of the King of Great Britain, residing at Madison, in the county of Dane and State of Wisconsin, have invented a certain new and useful Improvement in Electric Motors, of which the following is a specification.

My invention relates to motors, and has for its object to provide a new and improved motor for operating flexible shafts.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a view of a motor embodying my invention. Fig. 2 is a section on line 2 2, Fig. 1. Fig. 3 is a view showing a modified construction.

Like letters refer to like parts throughout the several figures.

One of the objects of my invention is to provide a construction by means of which a tool, such as a boring-tool or the like, may be easily, quickly, and conveniently moved to work in a number of different places and over a comparatively large range without changing the location of the driving-motor.

Referring now to the drawings, I have shown a motor proper, A, of any desired description, the armature-shaft of said motor being operatively connected to a flexible shaft B of any desired description, said flexible shaft being provided at its end with a holding device for the tool which it operates. The motor A is movably or pivotally mounted upon the support C. This support may be of any desired description, and as herein shown is forked or bifurcated, the motor being suspended between the two branches C′ and C^2. The motor may be pivotally connected to these branches in any desired manner. As herein shown, the field-magnets of the motor are mounted within the shell or casing A′, and the motor is pivotally connected to the support by means of suitable pins, bolts, or the like A^2, which pass through the branches C′ and C^2 of the support and the shell or casing of the motor, as shown in Fig. 2. This support at the bottom is preferably enlarged, as shown at C^3, so as to form a plate, and the support is movably or rotatably mounted upon the base D. The support may be connected with the base in any desired manner. As herein illustrated, the base is made of two pieces D and D′, and the piece D′ is provided with a central opening through which a projection on the support passes. A small plate D^2 is connected with the under side of the support and engages the part D′. In order to facilitate the movement of the parts, I provide the ball-bearings E and E′. The entire device is preferably mounted upon rollers or the like F, attached to the base D, so that the entire machine may be moved from place to place. It will be seen that by this construction the motor can be easily moved to various angles and positions without changing its location and that it may be so moved while operating, thus permitting the flexible shaft to be moved through a great range and to be operated without being bent in such a manner as to produce unnecessary and injurious friction and wear. When the motor is mounted in this manner, it is responsive to the movement of the flexible shaft, and it automatically, as it were, adjusts itself as the tool of the flexible shaft is moved from place to place, and hence it will be seen that it has great adaptability and permits a great range of movement and use of the tool without injury to the shaft, and thus greatly facilitates operations wherein such tool is required.

In Fig. 3 I have shown a modified construction. In this figure the flexible shaft B is not directly connected with the motor-shaft, as in Fig. 1, but is connected to the shaft M, which is connected by the gear M′ and pinion M^2 to the motor-shaft. The shaft M is mounted in bearings O, connected with the motor-frame, and hence the freedom of movement is not interfered with, and the flexible shaft B can be operated at a speed different from that of the motor-shaft.

I have described in detail a particular con-

struction embodying my invention; but it is of course evident that the construction may be varied in many particulars, and I therefore do not limit myself to the form and arrangement shown and described.

I claim—

1. A base, a support carried thereby and free to move in a plane with respect thereto, an electric motor carried by said support and free to move with respect thereto in a plane at an angle to the first-mentioned plane, and a flexible shaft connected to the armature-shaft of the motor.

2. An electric motor, comprising a flexible shaft, a bifurcated support between the arms of which the motor-frame is pivotally supported, said support provided with an enlarged end piece, and a base upon which said support is rotatably mounted.

3. An electric motor for flexible shafts, comprising an outer casing within which the armature is mounted, said casing movably supported so as to be free to move in two planes at right angles to each other, and a flexible shaft connected with the shaft of the motor, whereby the position of the motor is automatically changed by varying the position of the flexible shaft.

4. An electric motor, comprising a casing in which the armature is mounted, a bifurcated support between which said casing is movably suspended, said support provided with an enlarged end, a base upon which said enlarged end is rotatably mounted, an opening in said base, a projection on the enlarged end of the support, which projects into said opening, a holding-plate below said base, a bolt connecting the holding-plate and the base, and a flexible shaft connected with the armature-shaft of the motor, whereby the motor automatically tends to move to a position to keep the inclined shaft in approximate alinement.

5. An electric motor, comprising a flexible shaft adapted to be provided at its end with an operating-tool, a stand or support for said motor movably connected to a suitable base, the motor being pivoted to said stand, the parts so arranged that the motor has a universal motion, thus permitting the flexible shaft to be moved to different positions without producing bends which tend to cause excessive wear.

6. An electric motor comprising a flexible shaft to which the operating-tool is connected, said flexible shaft connected with the armature-shaft of the motor, a fork between the branches of which the motor-frame is pivotally mounted, an enlarged base for said fork and a base-support therefor upon which the fork is rotatably mounted, substantially as described.

7. In combination, a flexible shaft, a rigid shaft connected thereto and mounted so that it may freely vary its position in response to various positions of the flexible shaft, and a driving device for said rigid shaft.

8. In combination, an electric-motor armature-shaft, a flexible shaft connected thereto, a support in which the armature-shaft is pivoted to turn about an axis transverse to itself, and a base to which said support is pivoted to turn about an axis transverse to said first-mentioned axis whereby the armature-shaft may automatically adjust itself to varying positions of the flexible shaft.

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