No. 754,124. PATENTED MAR. 8, 1904.

D. P. BURDON.

ELECTRIC MOTOR.

APPLICATION FILED JULY 13, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 5.

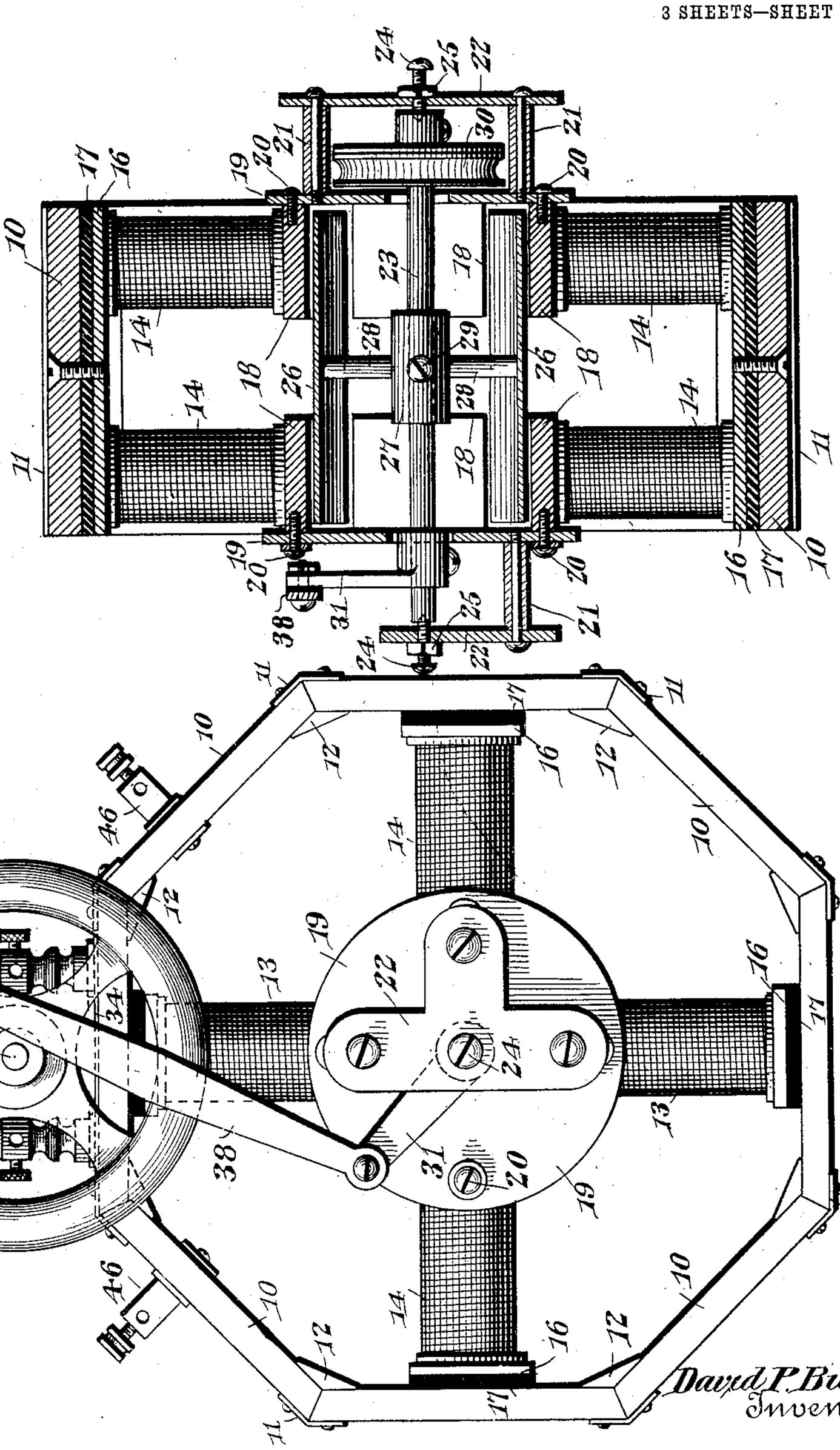

Fig. 1.

Witnesses
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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 6.

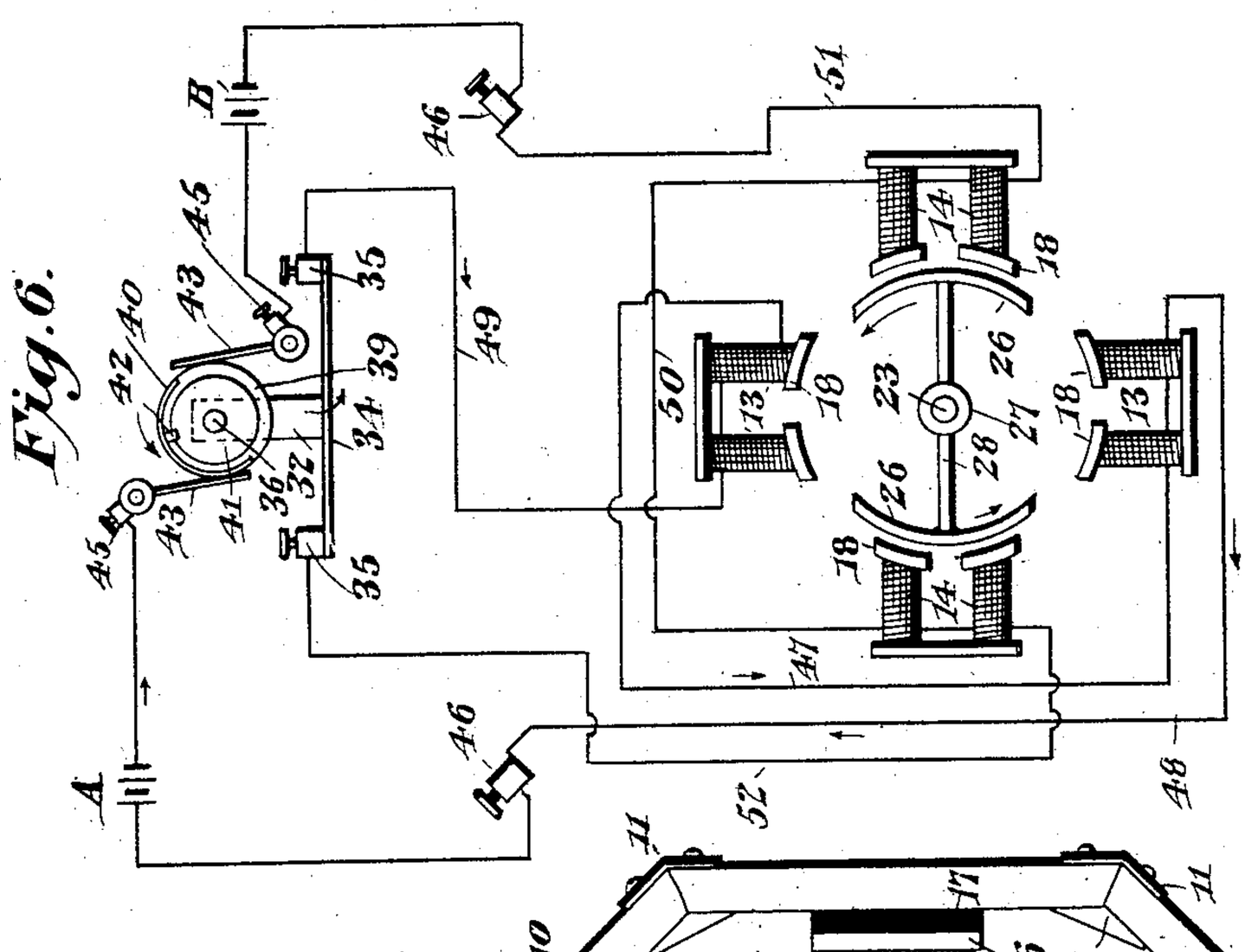
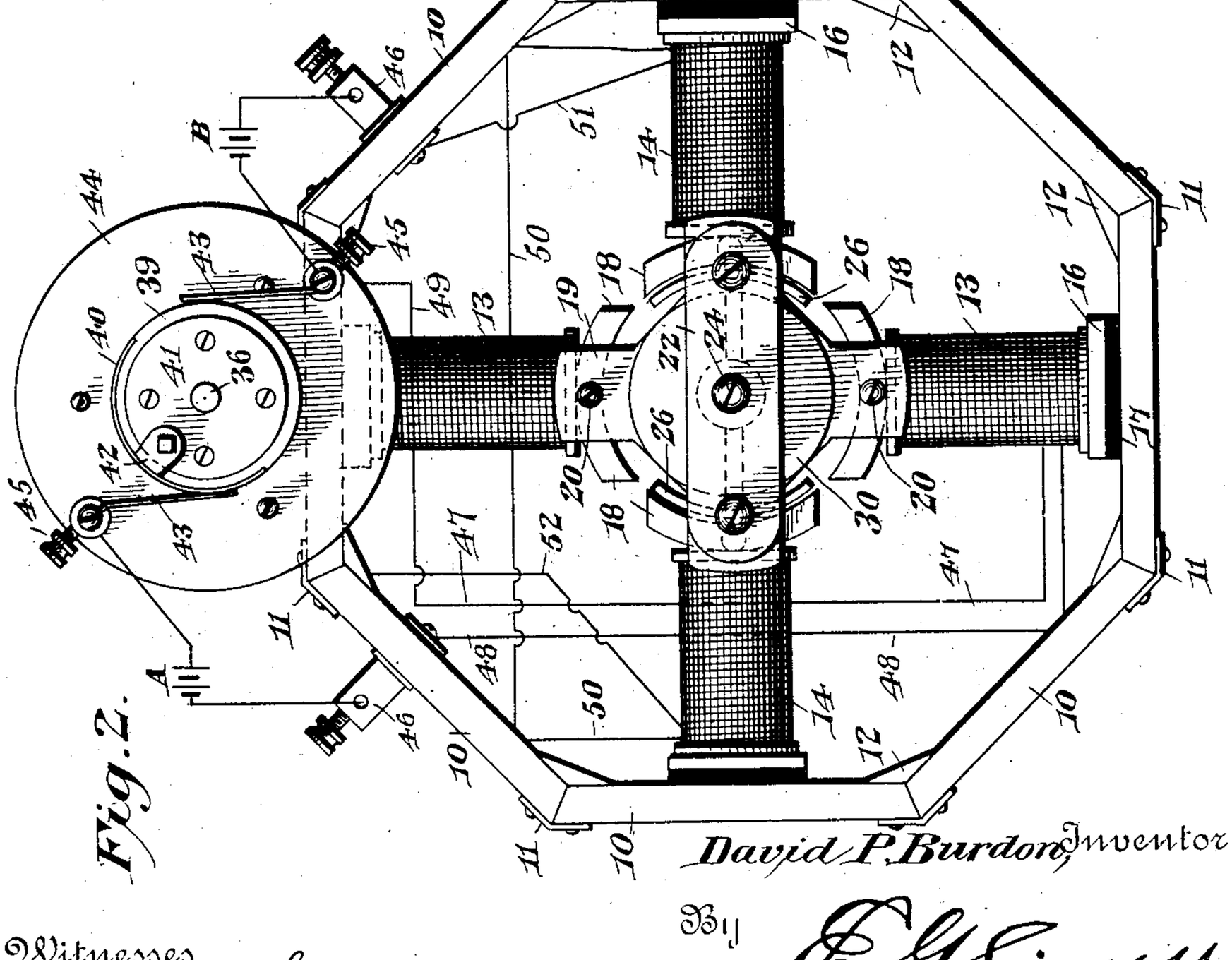


Fig. 2.



Witnesses
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NO MODEL. 3 SHEETS—SHEET 3.

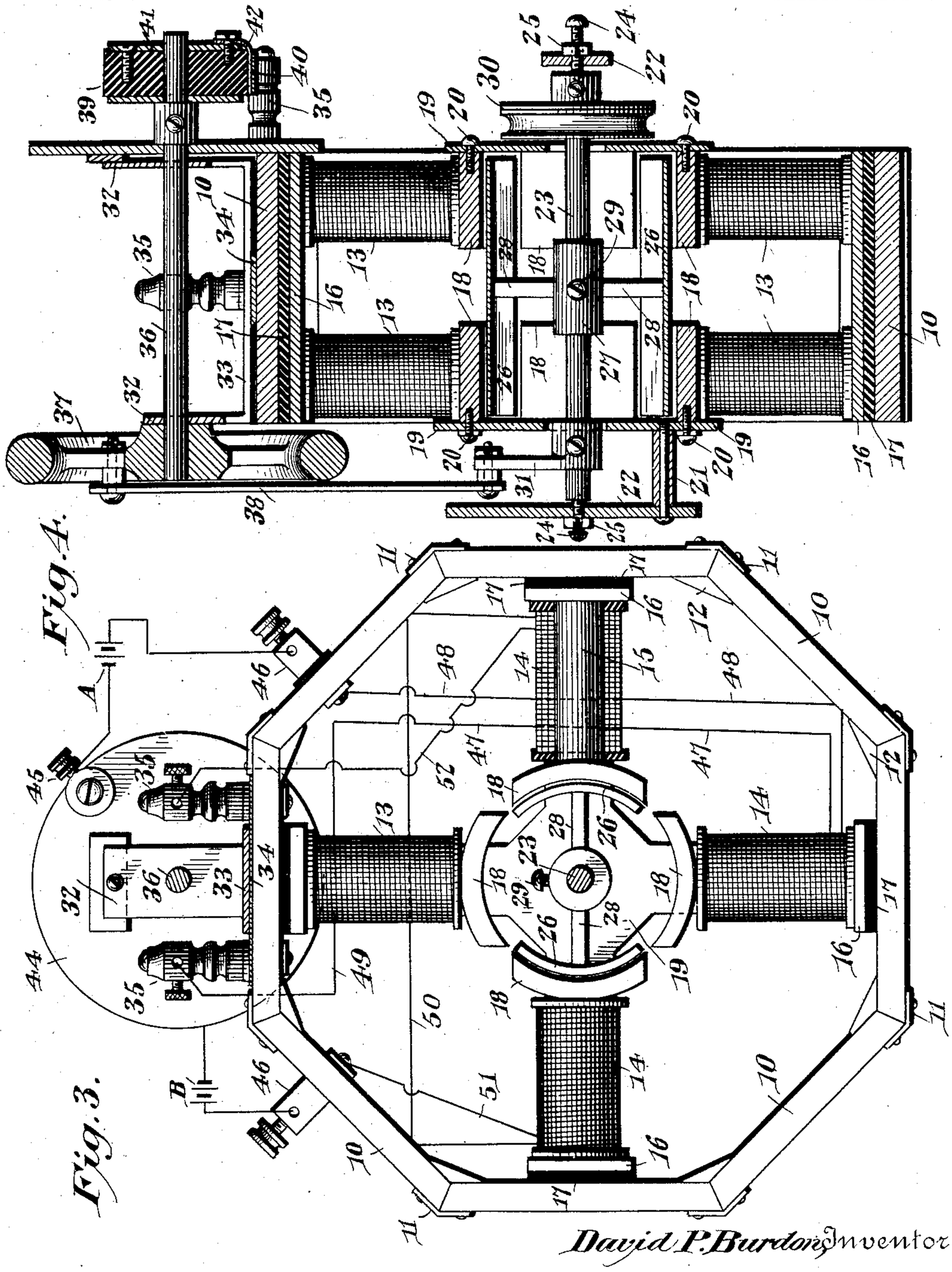

Fig. 4.

Fig. 3.

Witnesses
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No. 754,124. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

DAVID PATTON BURDON, OF JACKSONVILLE, FLORIDA, ASSIGNOR OF TWO-THIRDS TO SAMUEL P. HOLMES AND GUSTAVE MULLER, OF JACKSONVILLE, FLORIDA.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 754,124, dated March 8, 1904.

Application filed July 13, 1903. Serial No. 165,375. (No model.)

To all whom it may concern:

Be it known that I, DAVID PATTON BURDON, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented a new and useful Electric Motor, of which the following is a specification.

The present invention relates to oscillatory motors, and is useful for various purposes, such as operating swinging fans and rocking cradles, churns, or the like.

One of the objects of the invention is to provide a structure of the above character which is comparatively powerful in action, yet compact in structure, so that it will occupy but very little space, the various elements, moreover, being simple and entirely accessible should it become necessary from any cause to remove and repair or replace the same.

It is also the object to provide a structure that can be operated by different and distinct batteries of that class which, if used continuously, will wear out, the parts being so arranged in the structure that the different batteries are alternately employed, thus affording each intervals of rest. The invention, however, is not entirely limited to this particular arrangement, as any direct current from a single source may be employed, if desired.

The preferred form of construction is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of a motor constructed in accordance with the present invention. Fig. 2 is an elevation of the side opposite that shown in Fig. 1. Fig. 3 is a sectional view through the motor. Fig. 4 is a vertical cross-sectional view. Fig. 5 is a horizontal cross-sectional view. Fig. 6 is a diagrammatic view showing the circuits and electrical connections between the various elements.

Similar reference characters indicate corresponding parts in all the figures of the drawings.

In the embodiment illustrated a tubular frame is employed comprising angularly-disposed wall-sections 10, having their abutted edges detachably secured together by connecting-plates 11 and reinforcing-strips 12. Within this frame are mounted inwardly-extending independent sets of field-magnets 13 and 14, each magnet consisting of a pair of electromagnets, having cores 15 secured at their outer ends to transverse metallic bars 16, which are in turn fastened to the frame, insulation-sheets 17 being interposed between said frame and the bars 16. The inner ends of the cores are provided with curved pole-pieces 18, the ends of which are spaced apart, said pole-pieces thereby forming sectional rings within the frame, as illustrated more particularly in Fig. 3.

Fastened to the outer sides of the pole-pieces 18 are journal-brackets comprising face-plates 19, secured by screws 20 to said pole-pieces, posts 21, fastened to the face-plate, and journal-plates 22, secured to the outer ends of the posts. A rock-shaft 23 extends concentrically between the pole-pieces 18 and is supported by journal-screws 24, engaging the ends of the same, said screws passing through the plates 22 and normally locked against movement by jam-nuts 25. It will therefore be evident that the field-magnets are disposed radially with relation to this rock-shaft. Armature-magnets 26, of soft iron, are carried by the rock-shaft, being located in the space between the pole-pieces 18. These magnets 26 are connected with a hub 27 by means of arms 28, said hub being fastened by a suitable screw 29 to the rock-shaft. The armature-magnets are located on opposite sides of said shaft, and therefore simultaneously coact with the opposed field-magnets of each set, while alternately coacting with the sets.

Suitably secured to one end of a rock-shaft is a pulley 30, that is located between the face-plate 19 and the journal-plate 24, but outside the frame of the motor. This pulley constitutes the driving element from which power may be imparted to the machine or article to be driven, as will be readily understood. The opposite end of the rock-shaft 23 carries a crank-arm 31, located outside of the frame and to which the switch mechanism is connected. This

mechanism is as follows: Upon one side of the frame are located upstanding journal-posts 32, formed by the upturned terminals of a metallic strip 33, secured upon a transverse metallic sheet 34. Binding-posts 35 are attached to the opposite ends of the sheet 34. In the upstanding posts 32 is journaled a rotary shaft 36, disposed transversely of the frame and projecting beyond the same. One end of this shaft carries a fly-wheel 37, to which is fastened one end of a pitman 38, the other end of said pitman being connected to the crank-arm 31 of the rock-shaft. To the other projecting end of the rotary shaft 36 is secured a rotary drum 39, which constitutes one element of a switch, said drum having a contact-strip 40 on its periphery, which extends partially about the same. It is electrically connected with the shaft 36 by means of a metallic plate 41, secured to the drum and engaging said shaft, and a lug 42, carried by the strip and attached to the plate 41. As a result, the contact-strip 40 is in electrical connection with the binding-posts 35 through the shaft 36, the posts 32, the strip 33, and the plate 34. Coacting with the rotary drum 39 are metallic brushes 43, bearing against opposite sides of the same and secured to an insulator-disk 44, fastened to one side of the frame, these brushes being provided with binding-posts 45, to each of which one pole of a battery is attached, the other poles of the batteries being attached to binding-posts 46, secured to the frame on opposite sides of the switch.

While the electrical connections between the various elements may probably be made out in Figs. 2 and 3, they will be clearly understood by referring to Fig. 6. The upper and lower sets 13 of the field-magnets are electrically connected by a wire 47, while a connection is made from one set with one of the binding-posts 46 by means of a wire 48, the other set being connected to one of the binding-posts 35 by a wire 49. The horizontal sets of magnets 14 are connected by a wire 50, and one of these sets is electrically connected with the binding-post 46 by a wire 51, while the other set is in electrical communication with the other binding-post 35 through the medium of a wire 52. As stated in the preliminary portion of the specification, the motor is preferably operated by two separate batteries, and these are designated, respectively, A and B. The battery A has its poles connected with one of the binding-posts 46 and one of the brushes by means of the binding-post 45, the other battery B being in like manner connected with the other corresponding posts. Assuming, therefore, the armature in the position shown in Fig. 6, the rotary member of the switch will be so located that the contact-strip will be in engagement with the brush that is electrically connected with the battery A. Consequently the circuit of said battery will be closed, and the current passing through the various electrical connections will energize the field-magnets 13, while the other circuit being broken (the other brush 43 being out of engagement with the contact-strip) the horizontal magnets 14 will be deënergized. The magnets 13 will therefore attract the armature-magnets 26, causing an oscillation of the rock-shaft. This movement will rotate the shaft 36, carrying the rotary member of the switch around, so that the contact-strip will be moved into engagement with the other brush 43 while disengaging from the first-mentioned brush. As a consequence, the vertical magnets will be deënergized, while the horizontal magnets will be energized. A reverse movement of the armature therefore takes place, this movement, however, causing a continued rotation of the upper shaft 36. Thus the armature is oscillated, and a similar movement may be imparted through the medium of the pulley 30 to any machine or article driven. While the use of two separate sources of electrical energy is preferable, especially when supplied from batteries that will wear out if used continually, the invention is not limited in this respect, as certain combinations are useful when operated from any source of direct current.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In an oscillatory motor, the combination with a rock-shaft, of an armature-magnet carried by the rock-shaft, field-electromagnets alternately coacting with the armature-magnet for moving the same, a switch having electrical connections with the electromagnets and including a rotary member, and an eccentric connection between the rock-shaft and rotary member of the switch.

2. In an oscillatory motor, the combination with a rock-shaft, of an armature-magnet carried by the rock-shaft, field-electromagnets disposed radially with respect to the rock-shaft and alternately coacting with the armature-magnet for moving the same, a switch having electric connections with the electromagnets and including a rotary member, and an eccentric connection between the rock-shaft and rotary member of the switch.

3. In an oscillatory motor, the combination with a rock-shaft, of armature-magnets carried by the rock-shaft and projecting on opposite sides of the same, independent sets of electrically-connected field-magnets located ra-

dially about the shaft and alternately coacting with the armature-magnets, a switch having electrical connections with both sets of magnets and including a rotary member, and a crank-and-pitman connection between the rock-shaft and rotary member of the switch.

4. In an oscillatory motor, the combination with a rock-shaft, of armature-magnets carried by the rock-shaft and projecting on opposite sides thereof, independent sets of electrically-connected field-magnets located radially about the shaft and having their inner ends alternately coacting with the armature-magnets, a separate source of electrical energy for each set of magnets, and a common switch for alternately connecting and disconnecting said sources with their respective sets of magnets.

5. In an oscillatory motor, the combination with a rock-shaft, of armature-magnets carried by the rock-shaft and projecting on opposite sides thereof, independent sets of electrically-connected field-magnets located radially about the shaft and having their inner ends alternately coacting with the armature-magnets, a separate source of electrical energy for each set of magnets, and a common switch for alternately connecting and disconnecting said sources with their respective sets of magnets, said switch including a rotary member driven from the rock-shaft.

6. In an oscillatory motor, the combination with a rock-shaft, of an armature-magnet carried thereby, a field-magnet coacting with the armature-magnet, one of said magnets being an electromagnet, a rotary shaft, a crank-arm attached to the rock-shaft, a pitman connection between the crank-arm and the rotary shaft, and a switch having electrical connection with the electromagnet, said switch including a rotary member mounted on the rotary shaft.

7. In an oscillatory motor, the combination with a rock-shaft, of an armature-magnet carried thereby, a field-magnet coacting with the armature-magnet, one of said magnets being an electromagnet, a rotary shaft, a fly-wheel attached to the rotary shaft, a crank-arm fastened to the rock-shaft, a pitman connecting the crank-arm and fly-wheel, and a switch having electrical connection with the electromagnet.

8. In an oscillatory motor, the combination with a rock-shaft, of oppositely-extending armature-magnets carried thereby, field-electromagnets surrounding the shaft and disposed radially with respect thereto, a rotary shaft, a fly-wheel attached to the rotary shaft, a crank-arm fastened to the rock-shaft, a pitman connection between the crank-arm and fly-wheel, and a switch having electrical connections with the field-magnet, said switch comprising a drum attached to the rotary shaft and brushes bearing against the same.

9. In an oscillatory motor, the combination with a frame, of inwardly-extending field-magnets carried by the frame, a rock-shaft located between the inner ends of the field-magnets, an oscillatory magnet carried by the rock-shaft and coacting with said inner ends, and a switch having electrical connections with the field-magnets and including a movable member actuated from the rock-shaft.

10. In an oscillatory motor, the combination with a frame, of inwardly-extending radially-disposed sets of field-magnets carried by the frame and having their inner ends spaced apart, a rock-shaft located between said inner ends, armature-magnets carried by the rock-shaft and coacting with the inner ends, and a switch having electrical connections with the field-magnets and including a rotary member driven from the rock-shaft.

11. In an oscillatory motor, the combination with a frame, of inwardly-extending field-magnets secured at their outer ends to the frame, an oscillatory armature arranged between the inner ends of the field-magnets, a rotary shaft journaled upon the frame, an eccentric connection between the armature and the rotary shaft, and a switch having electrical connection with the field-magnets and including a rotary member mounted on the rotary shaft.

12. In an oscillatory motor, the combination with a frame, of inwardly-extending field-magnets secured at their outer ends to the frame and having their inner ends spaced apart, journal-brackets secured to said inner ends, a rock-shaft journaled in the brackets and extending between the inner ends of the field-magnets, and armature-magnets carried by the rock-shaft and coacting with said inner ends.

13. In an oscillatory motor, the combination with a tubular frame, of inwardly-extending field-magnets secured at their outer ends to the frame and extending inwardly within the same, said magnets having spaced pole-pieces at their inner ends, journal-brackets fastened to the outer sides of the pole-pieces, a rock-shaft journaled in the brackets and extending between the pole-pieces, armature-magnets carried by the rock-shaft and coacting with the pole-pieces, a switch having electrical connections with the field-magnets and including a rotary member, and connections between the rotary member and the rock-shaft for revolving the former.

14. In an oscillatory motor, the combination with a tubular frame comprising detachably-connected sections, of field-magnets located within the frame and secured at their outer ends to the sections thereof, pole-pieces attached to the inner ends of the magnets, journal-brackets fastened to the outer sides of the pole-pieces, a rock-shaft journaled in the brackets, armature-magnets carried by the rock-shaft and coacting with the pole-pieces, a rotary shaft journaled on the frame, a fly-wheel carried by the rotary shaft, a crank-arm connected to the rock-shaft, a pitman connection between the crank-arm and fly-

wheel, a switch having electrical connections with the field-magnets, said switch comprising a drum mounted on the rotary shaft and having a contact-piece, and brushes coacting with the drum and alternately engaging the contact-piece.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

DAVID PATTON BURDON.

Witnesses:
L. A. SHIPMAN,
GEO. W. THOMAS, Jr.