Feb. 14, 1950 H. J. FINDLEY 2,497,402

ELECTROMAGNETIC DEVICE

Filed Aug. 26, 1946

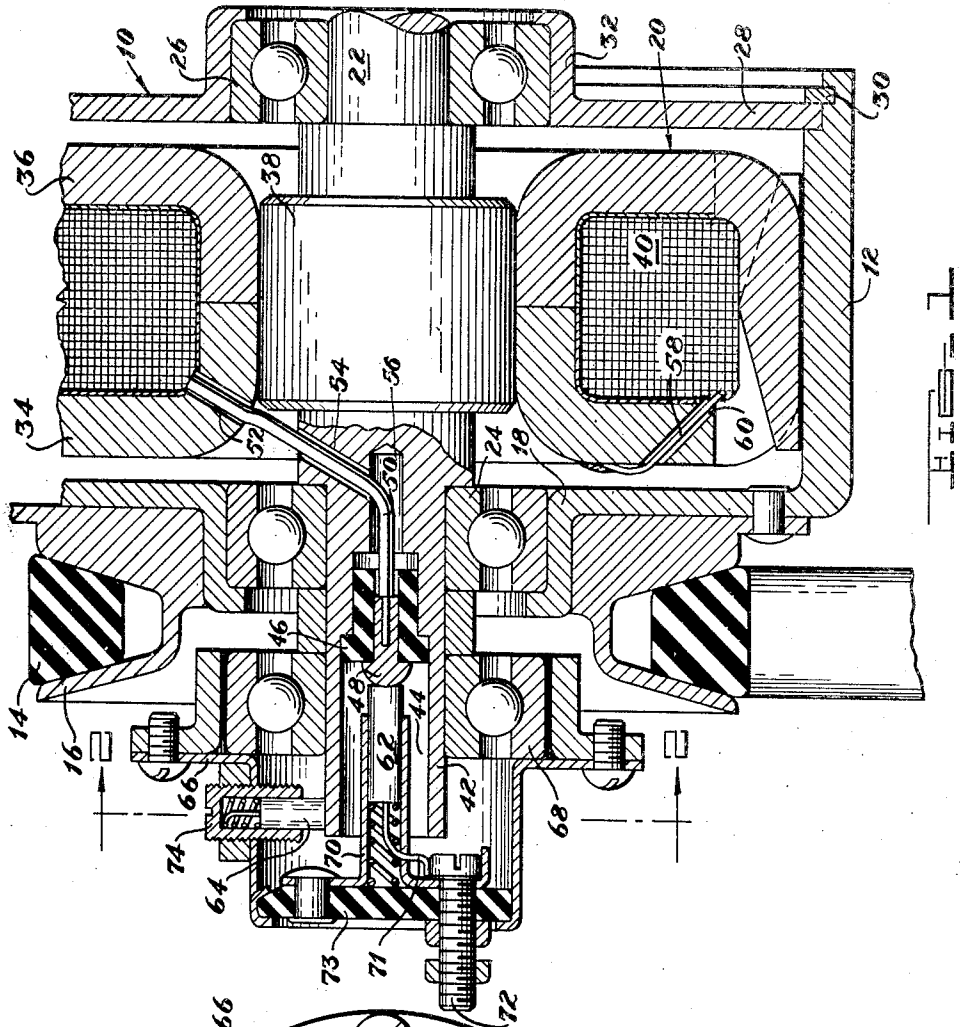


FIG. 1

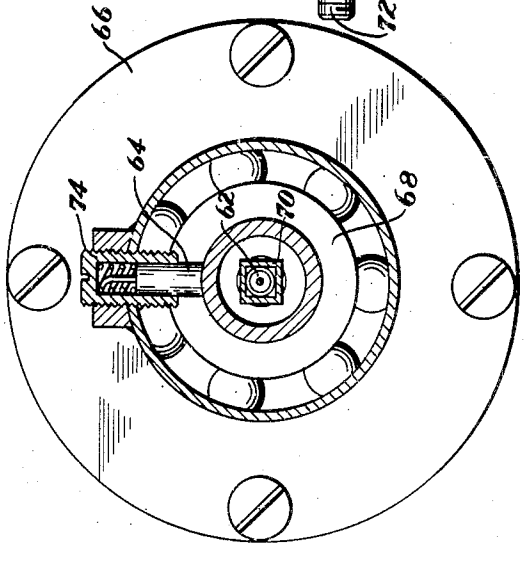


FIG. 2

INVENTOR.
HOWARD J. FINDLEY
BY
McDonald & Fraser
ATTORNEYS

Patented Feb. 14, 1950

2,497,402

UNITED STATES PATENT OFFICE

2,497,402

ELECTROMAGNETIC DEVICE

Howard J. Findley, Chardon, Ohio, assignor to Eaton Manufacturing Company, Cleveland, Ohio, a corporation of Ohio

Application August 26, 1946, Serial No. 693,061

2 Claims. (Cl. 172—284)

1

This invention relates to electromagnetic power transmitting devices and more particularly to novel structural features thereof.

Broadly the invention comprehends a provision of electromagnetic power transmitting devices of the eddy current type whereas the energizing coils of the devices are supplied current directly at a point approximating the axis of the devices.

Heretofore in the construction of eddy current electromagnetic power transmitting devices it has been the general practice to provide slip rings as a means for supplying current to the energizing coils thereof. The instant invention through the incorporation of structural refinements in the construction of power transmitting devices of this type eliminates the use of slip rings and as such provides a more direct, effective and economical means of supplying current from a source of electrical power to the energizing coils of the devices.

An object of the invention is the provision of an eddy current electromagnetic power transmitting device having means for supplying current to the energizing coil thereof without the necessity of employing costly slip rings.

Another object of the invention is the provision of an eddy current electromagnetic power transmitting device of simplified construction and economical cost.

A further object of the invention is the provision of an eddy current electromagnetic power transmitting device of high operating efficiency having means incorporated therein providing for the effective supply of current to the energizing coil through brushes located near the axis of the contacting rotating portions of the device.

Other objects and advantages of the invention will appear from the following description taken in connection with the drawings, forming a part of the specification; and in which:

Figure 1 is a fragmentary cross sectional view of an eddy current electromagnetic power transmitting device embodying novel structural features, and

Figure 2 is a cross sectional view taken along line 2—2 Figure 1.

Although numerous eddy current electromagnetic power transmitting devices have been devised and manufactured over a period of a great many years no practical structure has heretofore been devised employing other than slip rings in association with current supplied brushes for the purpose of delivering current to the energizing coils of the devices. By the provision of current supply means as taught by the instant invention wherein the current supplied brushes are located at or near the axis of the device in direct contact with rotating parts of the power transmitting devices, slip rings are eliminated, thus reducing the overall production cost of the devices, as well as affording a shorter more direct and effective path of flow of current from the brushes to the energizing coils of the devices. The power transmitting device herein devised is of the type shown by Patent No. 2,367,163 to Martin P. Winther, dated January 9, 1945.

2

Referring to the drawings for more specific details of the invention 10 represents generally an eddy current electromagnetic power transmitting device comprising a drum member 12, driven from a suitable motive source by the belt 14 received by a grooved pulley 16 fixedly secured upon the hub 18 of the drum, and a cooperating rotor 20 mounted and fixedly secured internally of the drum 12 upon a driven output shaft 22. The drum is supported for rotation upon a pair of bearings 24 and 26 disposed axially on opposite sides of the rotor upon shaft 22, the open end of the drum having a cover plate 28 secured therein by a snap ring 30, said cover plate having a hub section 32 journaled upon the bearing 26 for supporting the drum in its rotation relative to the shaft.

The rotor 20 consists of a pair of identical annular members 34 and 36 of cross sectional U shape fixedly mounted in adjacent relationship upon an enlarged portion 38 of shaft 22 and providing therebetween an annular space for the reception of a ring shaped energizing coil 40. The members 34 and 36 forming the field body of the power transmitting device are each provided with pole arms axially extended in alternately overlapping relation externally of the coil 40, said arms at their periphery being spaced from the internal annular surface of the drums by a predetermined amount.

The shaft 22 has provided in one end 42 thereof a central bore 44 for the reception of an annular ring 46 supporting a contact button 48 connected to one end 50 of the coil 40, said coil wire extending from the coil through an opening 52 in member 34 thence through an opening 54 in the surface of the shaft communicating with a bore 56 forming a part of bore 44 in the shaft. The other end 58 of the coil extends therefrom through an opening 60 in member 34 and is soldered or otherwise fixedly secured upon the exterior of member 34 to provide a contact therewith for the purpose of completing the current flow circuit, said flow from this end of the coil

passing through the member 34, thence through the enlarged portion 38 of the shaft to the end 42 of the shaft.

The contact button 48 and outer periphery of the shaft 22 at the end 42 thereof are supplied energizing current for the coil 40 by way of spring pressed brushes 62 and 64 respectively supported in a stamped housing 66 which is journaled upon a bearing 68 supported on shaft 22. The brush 62 is supported for axial movement in a square cage 70 extending into the bore 44 of the shaft upon an extension of the axis line of the device and shaft 22, said cage being mounted upon but insulated from the housing 66. A flexible lead 71 from the brush 62 is connected to a terminal bolt 72 secured in the insulation 73, said terminal being adapted to be connected to a power line from a storage battery or other source of electric current. The brush 64 is mounted for radial movement in a hollowed out plug 74 threadably adjustable in housing 66 providing the ground terminal of the coil 40 whereas the housing 66 is adapted to remain stationary in fixedly assembled position upon the apparatus with which the device is adapted to be associated. The electrical current circuit for the device and coil thereof is thus made from the body of the apparatus, not shown, as a transmitting agent back to the other terminal of the current source so as to make a complete circuit from the coil through the medium of the brushes 62 and 64, contact button 48 and shaft 22 to the source of electrical current.

Although the brush 64 is hereinabove defined as specifically related to the coil 40 as a ground terminal thereof, said brush can similarly to brush 62 also be a current supplied or hot brush for the coil as the use might so warrant. Furthermore it is to be readily realized that brush 64 can be assembled in a similar manner to brush 62 but at the opposite end of shaft 22 thereby placing both brushes in approximately the same axial zone relative to the drive.

It is to be noted in view of the structure as shown and described that the shortest most direct path of current flow is attained thus providing for the effective energization of the coil while at the same time presenting an economical structure through the elimination of more costly slip rings ordinarily employed in the power transmitting device of this type.

The electromagnetic device although herein specifically shown as a power transmitting device or drive can readily be adapted for use as an electromagnetic brake or the like and accordingly the illustration made is not to be taken as a limitation of invention.

While this invention has been described in connection with certain specific embodiments, the principle involved is susceptible of numerous other applications that will readily occur to persons skilled in the art. The invention, therefore, is limited only as indicated by the scope of the appended claims.

What I claim is:

1. An electromagnetic device comprising a rotatable member, a second rotatable member associated therewith, an electromagnet carried by one of the members, a shaft secured to the member carrying the electromagnet, said electromagnet having leads at the respective ends thereof, one lead being secured to the rotatable member on which the magnet is carried and the other lead being insulatingly supported in the shaft with its terminus lying upon the axis of the shaft, a stationary current supply axially spring pressed brush extending along the axis of the shaft having contacting association with the coil lead supported in the shaft at its terminus, a second stationary current supply axially spring pressed brush extending perpendicularly to the axis of the shaft having contacting relation upon the outer periphery of the shaft and a housing journalled on the shaft supporting the brushes for current conducting engagement respectively with the terminus of one lead from the coil and with the shaft.

2. An electromagnetic device comprising a rotatable member, a second rotatable member associated therewith, an electromagnet carried by one of the members, a shaft secured to the member carrying the electromagnet, said electromagnet having leads at the respective ends thereof, one lead being secured to the rotatable member on which the magnet is carried and the other lead being insulatingly supported in the shaft terminating in a current contactor button upon the axis of the shaft, a current supply brush mounted in axial alignment along the axis of the shaft having resilient current conducting and contacting relation with the contactor button, a second current supply brush mounted in radial relation to the shaft having resilient current conducting and contacting relation with the outer periphery of the shaft radially outwardly disposed of the other brush, and a stationary bracket journalled on the shaft supporting the brushes for axial movement therein relative to their respective axes.

HOWARD J. FINDLEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,720,619	Baldwin	July 9, 1929
2,038,059	Reichel	Apr. 21, 1936
2,068,189	Mead	Jan. 19, 1937
2,109,991	French	Mar. 1, 1938
2,360,191	Beach	Oct. 10, 1944
2,401,187	Prince	May 28, 1946

FOREIGN PATENTS

Number	Country	Date
88,440	Switzerland	Mar 1, 1921