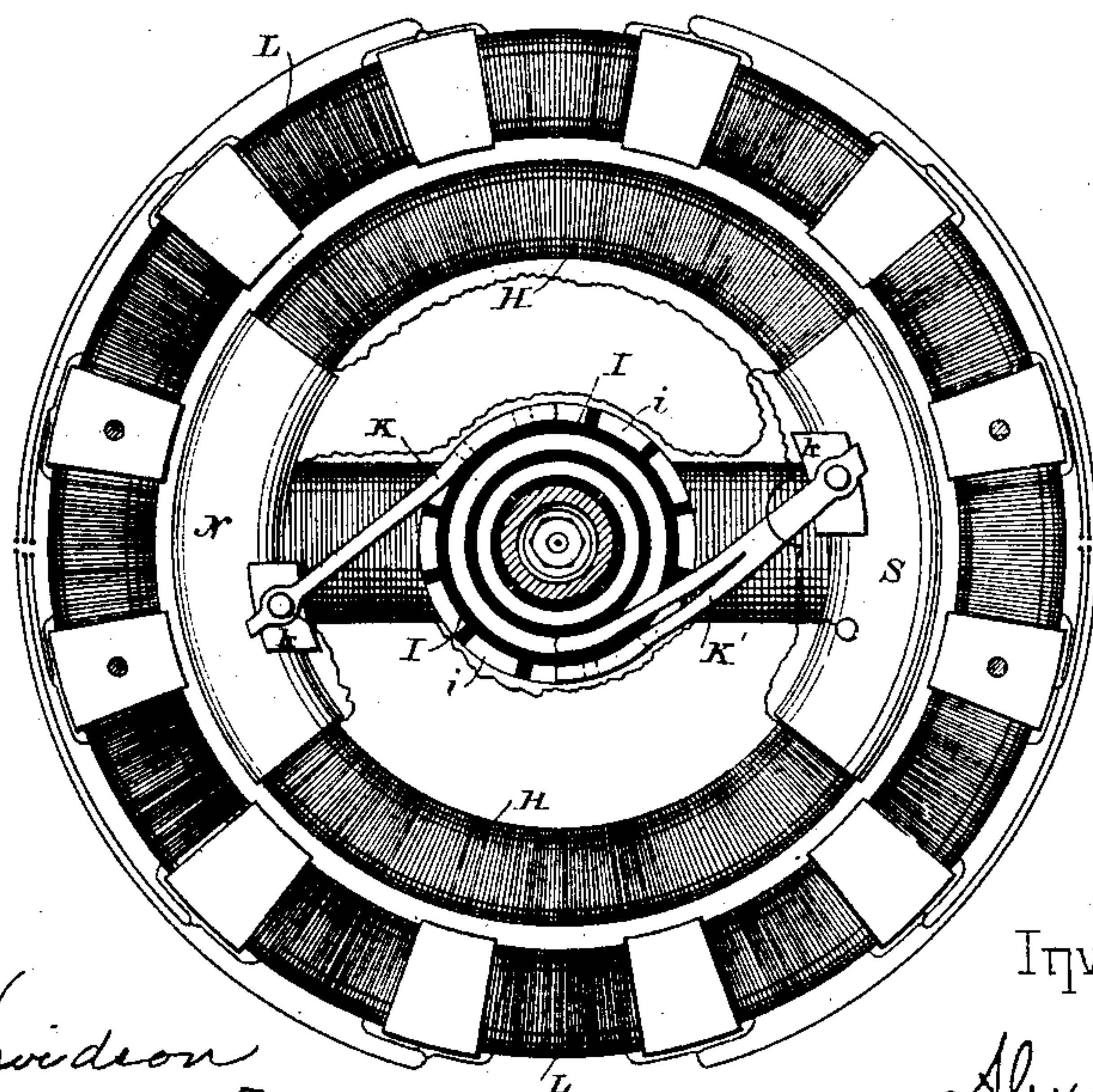
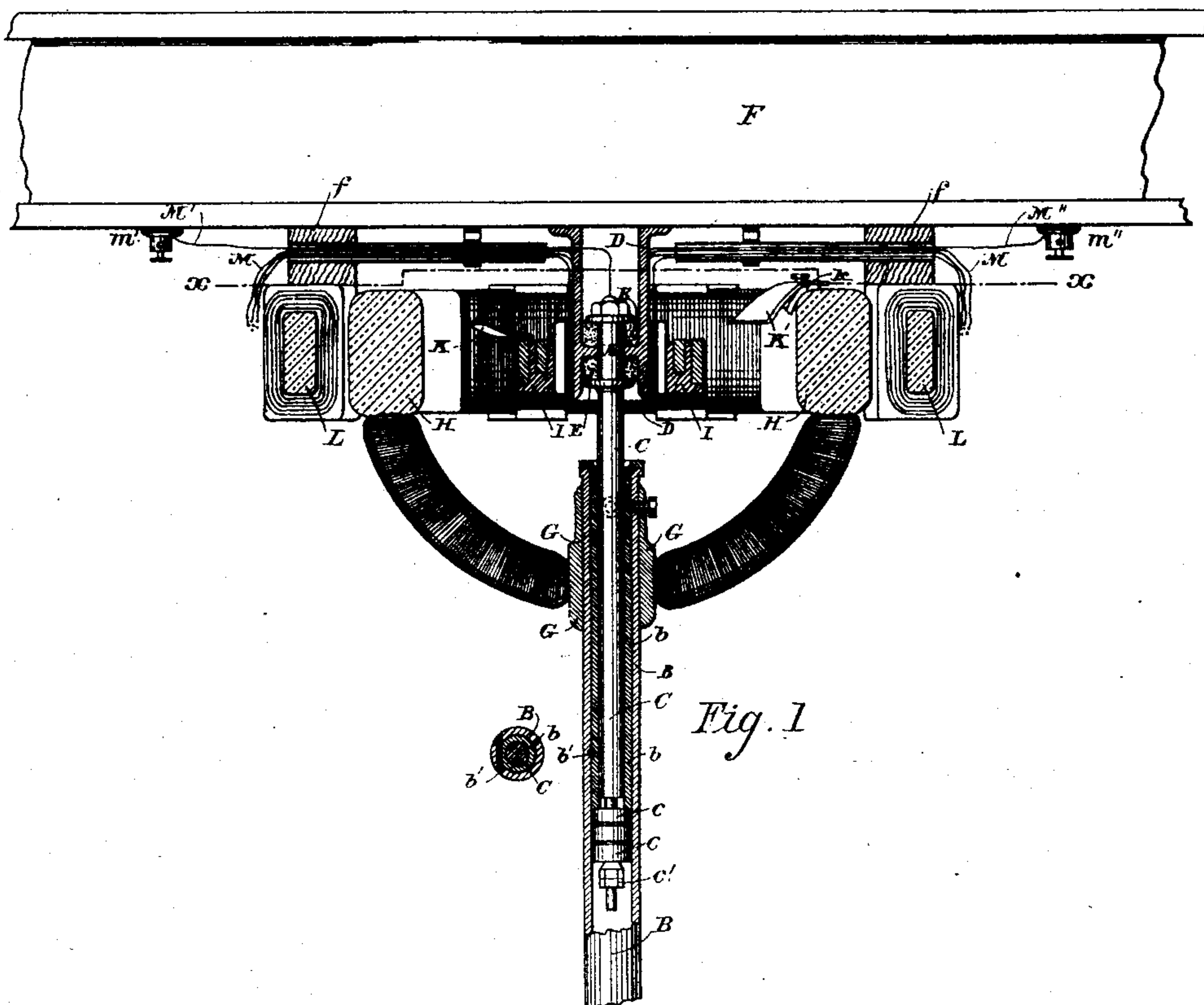


(No Model.)

A. WATT.

ELECTRIC DRIVING APPARATUS FOR CENTRIFUGAL MACHINES.
No. 316,317. Patented Apr. 21, 1888

Patented Apr. 21, 1885.



Witnesses,
Carrie E. Davidson
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UNITED STATES PATENT OFFICE.

ALEXANDER WATT, OF LIVERPOOL, COUNTY OF LANCASTER, ENGLAND.

ELECTRIC DRIVING APPARATUS FOR CENTRIFUGAL MACHINES.

SPECIFICATION forming part of Letters Patent No. 316,317, dated April 21, 1885.

Application filed June 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER WATT, of Liverpool, in the county of Lancaster, in the Kingdom of England, have invented certain
5 new and useful Improvements in Electrical Driving Apparatus for Centrifugal Machines, of which the following is a specification.

The object of this invention is further improvements in the driving of centrifugal machines than those described in the specification of an application for Letters Patent which
10 accompanies this; and it is designed for driving centrifugal machines suspended from an elastic joint or buffer, which allows of oscillation to the cage, such as is described in the specifications of Weston's patents. It is best described by aid of the accompanying drawings, in which—

Figure 1 is a sectional elevation, and Fig.
20 2 a sectional plan on lines $x\ x$.

In these, A is the point of suspension of the fixed shaft C; B, the driving-spindle; C, the inner or supporting spindle, suspended from the bracket D by india-rubber or other elastic
25 buffers E. The bracket D is securely fixed to the girder F or other strong overhead support. The spindle C is fixed—that is to say, it does not revolve, but, being supported on elastic buffers, allows a certain amount of oscillation at its lower end, the center point of suspension being practically free from oscillation.

c are steel washers resting on a nut, c' , at the lower end of spindle C.

35 b is a brass bush or sleeve securely attached to the revolving spindle B by a pin, b' , as shown, or by a nut screwed over the upper flanges or otherwise, and, resting on the washers c , sustains the weight of the cage revolving freely round the fixed spindle C. As this, however, forms no part of my invention, further description is unnecessary.

G is a bracket fixed to and revolving with the spindle B, and forming part of the field-magnet which takes the place of the driving-pulley to convey motion to the machine.
45

H is a triple electro-magnet rotating with shaft B, and having poles N S. I is the commutator, placed with its axis on the line of no
50 oscillation or of suspension; K K', brushes on

insulating-pieces k . L is the stationary armature of the motor, arranged in the form of a Pacinotti ring. The magnet H is in the form of a ring with a socketed arch as a third arm below, and two poles of soft iron projecting a little beyond the remainder of the
55 ring after being wound with the wire. The three magnets joining at the poles can be wound in multiple arc or in series, as desired, so as to produce only two poles at the points N and S. The armature L is wound like an ordinary Gramme or Pacinotti ring, and the twelve coils shown each connected with one of the points i on the commutator.
60

The commutator is placed on the line where the oscillation is at zero. The twelve wires M from the armature traverse the inner line of dots, Fig. 2, and are connected to the twelve white conducting-divisions i of the commutator. The wires M' M'', connecting the source
65 of electricity with the apparatus, pass, respectively, the one to the spindle C and the other down through the inner ring of dots in Fig. 2 to the middle or conducting ring of the commutator.
70

The course of the current is as follows: It enters through the binding-screw m' and traverses the wire M', passing down through the spindle C to the metal of the field-magnet, thence round the coils of the magnet, out at
75 the brush K, through one of the sections of the commutator, to the opposite section, thence, by means of the double brush K', through the center conducting-ring, to the wire M'', connecting with the binding-screw m'' .
80

The armature L is supported to the beam F by bolts passing through the insulating-block f to the beam F. It will be seen that, the commutator being on the zero-line of oscillation, no amount of oscillation in the suspended cage
85 could hurt its working, the magnets' poles being also in the same zero-line.
90

I claim as my invention—

1. In a centrifugal machine, the combination of the annular magnet H, fixed concentrically to the shaft to be driven, the annular armature L, just clearing the magnet and held stationary, and the commutator, I placed inside the magnet and held stationary, all as
95 nearly as practicable in the same plane with
100

the point of suspension, substantially as described.

2. The combination, with a flexible suspension-joint for centrifugal machines, of the field-magnet of an electric motor fixed to the shaft to be driven, and a fixed armature having its commutator so placed that the center of the pole-pieces, the contact-surface of the commutator, and the zero-line of oscillation shall all be in the same plane, substantially as shown and described.

3. In electrical driving apparatus for centrifugal machines, a ring electro-magnet fixed to the shaft to be driven by an arched bar in magnetic contact therewith, the whole forming a single magnet with three bars all wound with wire, substantially as described.

4. The combination, with the suspension-bracket D and suitable elastic packing, of the shafts C and B, and the commutator I, sup-

ported by said bracket and insulated therefrom, and the magnet H, attached to the said shaft B and revolving around the commutator and inside the stationary armature L, substantially as described.

5. In electrical driving apparatus for centrifugal machines, the combination, with the shafts B and C, of the triple electro-magnet H, the fixed armature L, and commutator I, the brushes K, attached to and moving with the said magnet H, and suitable conducting-wires, all substantially as described and shown.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALEXANDER WATT.

Witnesses:

I. OWDEN O'BRIEN,
WM. P. THOMPSON.