M. I. GINSBURG.

SHORT CIRCUITING DEVICE FOR MOTORS.

APPLICATION FILED AUG. 24, 1916.

1,245,701.

Patented Nov. 6, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

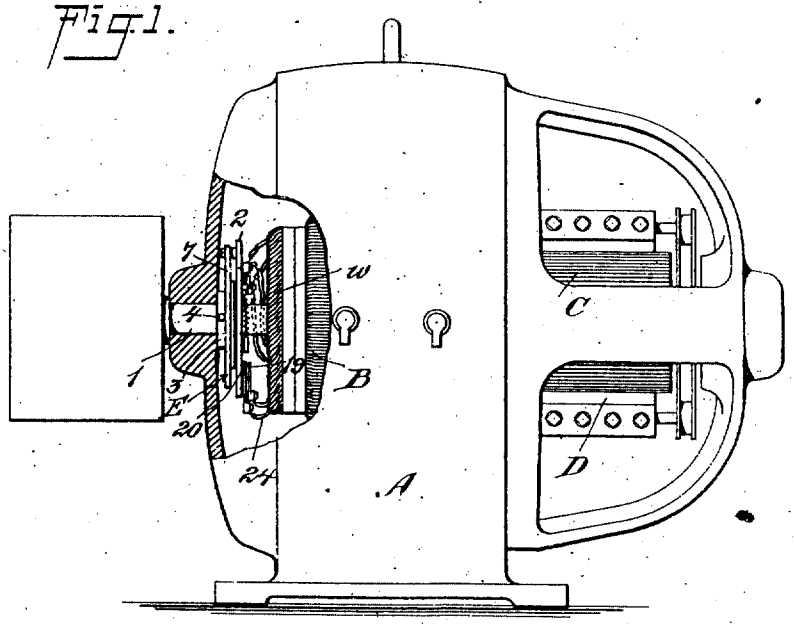
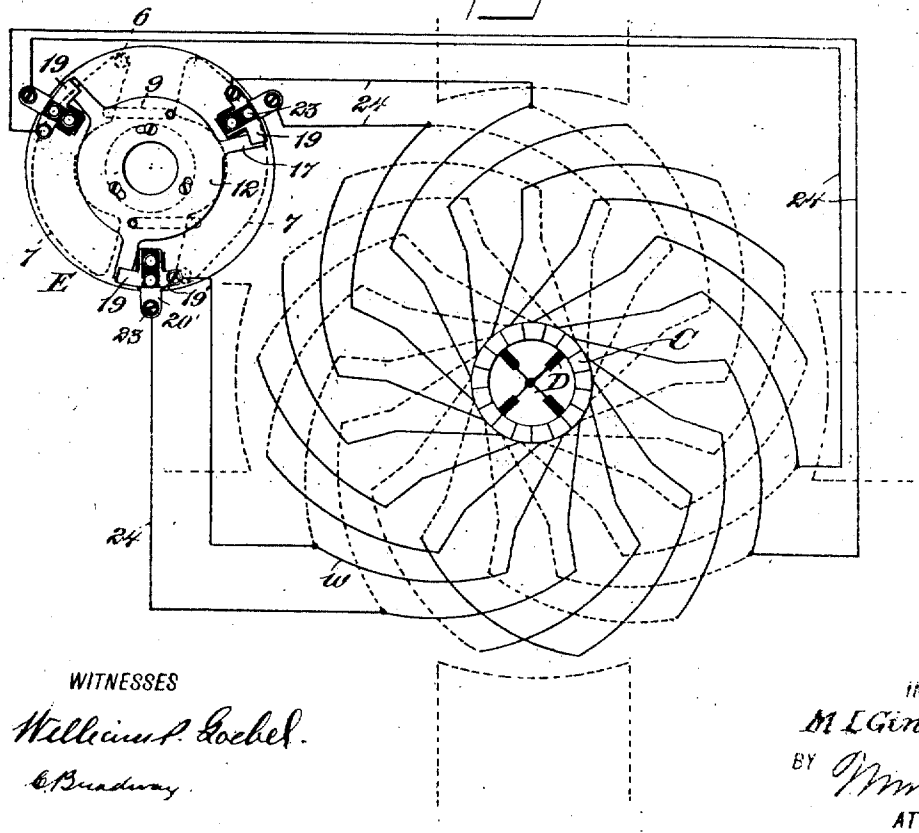


Fig. 2.



WITNESSES

William P. Goebel.

66 Broadway

INVENTOR

M. I. Ginsburg

BY Munn & Co.

ATTORNEYS

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2 SHEETS—SHEET 2.

Fig. 3.

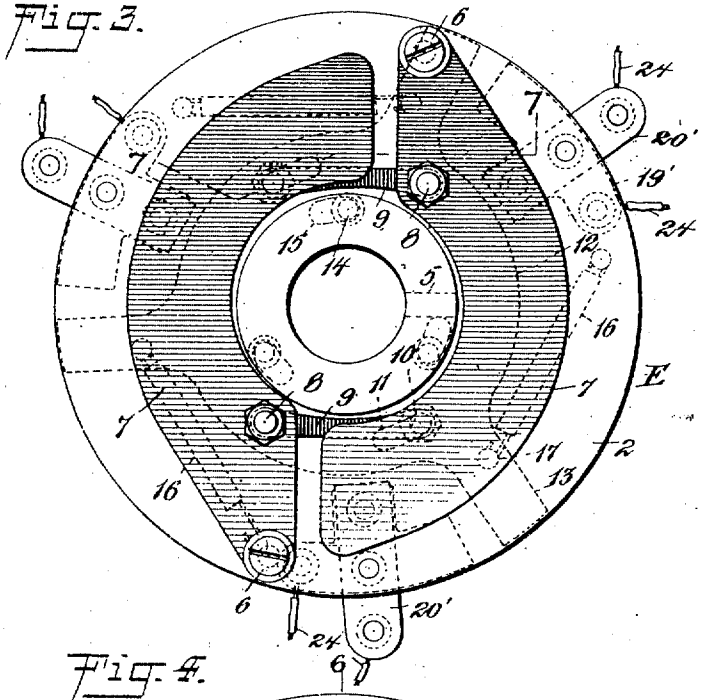


Fig. 5.

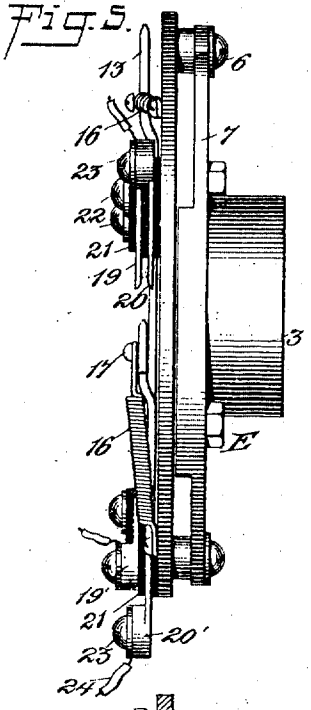


Fig. 4.

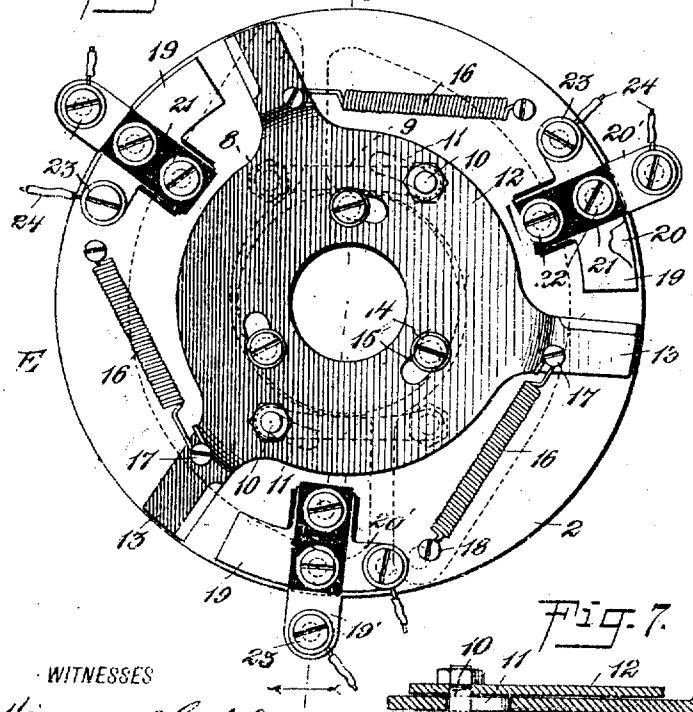


Fig. 6.

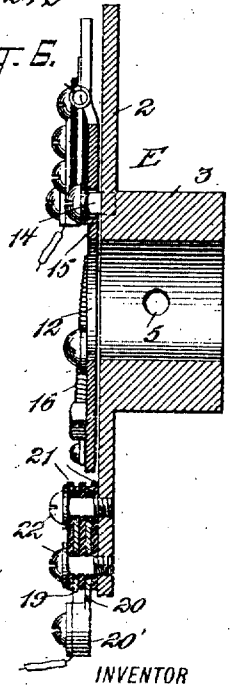
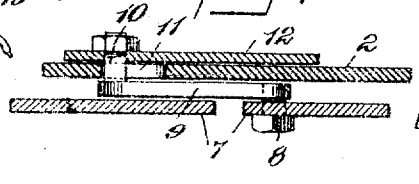


Fig. 7.



WITNESSES

William P. Goebel.

B'Broadway

INVENTOR

M. I. Ginsburg

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

MICHAEL I. GINSBURG, OF BALTIMORE, MARYLAND.

SHORT-CIRCUITING DEVICE FOR MOTORS.

1,245,701. Specification of Letters Patent. Patented Nov. 6, 1917.

Application filed August 24, 1916. Serial No. 116,582.

To all whom it may concern:

Be it known that I, MICHAEL I. GINSBURG, a citizen of the United States, and a resident of Baltimore, in the county of Baltimore City and State of Maryland, have invented a new and Improved Short-Circuiting Device for Motors, of which the following is a full, clear, and exact description.

This invention relates to electric machines and deals particularly with short-circuiting devices.

The invention has for its general objects to improve and simplify the construction and operation of apparatus of this character so as to be reliable and efficient in use, and comparatively inexpensive to manufacture and keep in operative condition.

A more specific object of the invention is the provision of an improved short-circuiting device which automatically comes into play when the armature attains a predetermined rotative speed, whereby the windings of the armature are short-circuited.

With such objects in view, and others which will appear as the description proceeds, the invention comprises various novel features of construction and arrangement of parts which will be set forth with particularity in the following description and claims appended hereto.

In the accompanying drawings which illustrate one embodiment of the invention and wherein similar characters of reference indicate corresponding parts in all the views,

Figure 1 is a side view of a motor with a portion of the frame broken away to illustrate the automatic short-circuiting device;

Fig. 2 is a diagrammatic view showing the short-circuiting device connected with the windings of the armature;

Fig. 3 is an enlarged view of that side of the short-circuiting device having the centrifugal weights;

Fig. 4 is a view of the opposite side of the short-circuiting device;

Fig. 5 is an edge view of Fig. 4;

Fig. 6 is a sectional view on the line 6—6, Fig. 4; and

Fig. 7 is a detail sectional view on the line 7—7, Fig. 3.

Referring to the drawing, A designates the frame of the motor, which contains the usual field poles (not shown), and arranged in coöperative relation with the field poles is the armature B having a commutator C on which bears the brushes D. On the shaft 1 of the armature is mounted the automatic short-circuiting device E. The motor shown is of the four-polar type, but any number of poles may be employed.

It will be understood that normally the short-circuiting device E is inoperative and the motor starts on single-phase alternating current on the repulsion principle, by means of the current passing through the field windings, inducing currents in the armature windings, which currents circulate in the armature between points connected by the brushes, bearing on the commutator, but when the armature attains a predetermined speed, the windings thereof are short-circuited by the device E, so that the motor operates as an induction motor. It has been found in actual practice that the windings of the armature can be effectively short-circuited without providing a contact device grounding or short-circuiting the commutator bars, but the short-circuiting effect can be accomplished by connecting the armature windings together at certain equidistant points, as, for instance, in a four-pole machine with a series wound armature the armature windings can be connected together at points approximately one hundred and twenty degrees apart.

The short-circuiting device comprises a disk 2 having a hub 3 which is clamped to the armature shaft by a set-screw 4 screwed into the opening 5 of the hub. Fulcrumed at diametrically opposite points 6 on the disk 2 are weights 7 which swing outwardly from the hub in a plane transverse to the axis of rotation when the armature rotates. Each weight 7 has connected therewith at 8 a link 9, and passing through each link is a bolt 10, which also passes through a slot 11 in the disk 2. These bolts are connected with a short-circuiting element in the form of a disk 12 provided with radially extending knife switches 13. This disk 12 is held on the carrying disk 2 by means of screws or pins 14 which pass through slots 15 in the disk 12 and screw into the disk 2. The switch blades are held in open circuit position, as shown in Fig. 4, by helical extension springs 16 fastened at 17 to the switch blades and at 18 to the disk 2. Coöperating with each switch blade is a pair of contacts 19 and 20 between which the associated knife blade engages. These contacts 19 and 20 are separated from each other and from the disk 2 by insulation 21, and they are fastened to

the disk by screws 22. The contacts 19 and 20 have ears or extensions 19′ and 20′ which have binding screws 23 for securing circuit wires thereto. As shown in Fig. 2, the winding *w* of the armature has wires 24 connected therewith at three points approximately one hundred and twenty degrees apart, and these wires in turn lead to the contacts 19 and 20, so that when the short-circuiting element 12 is shifted from the position shown in Fig. 4 to that shown in Fig. 2 by the centrifugal force acting on the weights 8, the coils of the armature will be short-circuited. It has been found that in a four-pole motor three points of connection are sufficient, and also with any other multipolar machines there should be an odd number of connections between the armature winding and the contacts of the short-circuiting device. Two wires are run from a place near to each selected point on the armature winding to the short-circuiting device, increasing the efficiency and for extra reliability, so that if one wire should become broken the other wire will serve the intended purpose. It will be noted from Fig. 1 that the short-circuiting device is at the end of the armature opposite from the commutator, and it lies within the casing of the motor. The contacts of the short-circuiting device can be connected with the armature winding at either end of the armature.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and method of operation will be readily understood by those skilled in the art to which the invention appertains, and while I have described the principle of operation, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative and that such changes may be made when desired as fall within the scope of the appended claims.

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

1. A short-circuiting device of the class described, comprising a carrier, contacts fixedly mounted on the carrier, an element movably mounted on the carrier and having members forming contacts movable into and out of engagement with the fixed contacts, spring means tending to hold said member in a position with the contacts thereof out of engagement with the fixed contacts, centrifugal weights mounted on the carrier at the side opposite from the said member and movable in a plane parallel with the plane in which the member has rotary movement, and means extending from one side of the carrier to the other for connecting the weights with the said member.

2. A short circuiting device comprising a carrier, fixed contacts thereon, a member movably mounted on the carrier at one side and having a limited rotary movement, said member being a conductor and having members forming contacts for engaging the first-mentioned contacts, centrifugal weights mounted on the carrier at the side opposite from the member, said carrier having slots, links connected with the weights, and connections between the links and member and extending through the slots of the carrier.

MICHAEL I. GINSBURG.

Witnesses:
WM. WEINBLATT,
LOUIS FEINSTEIN.