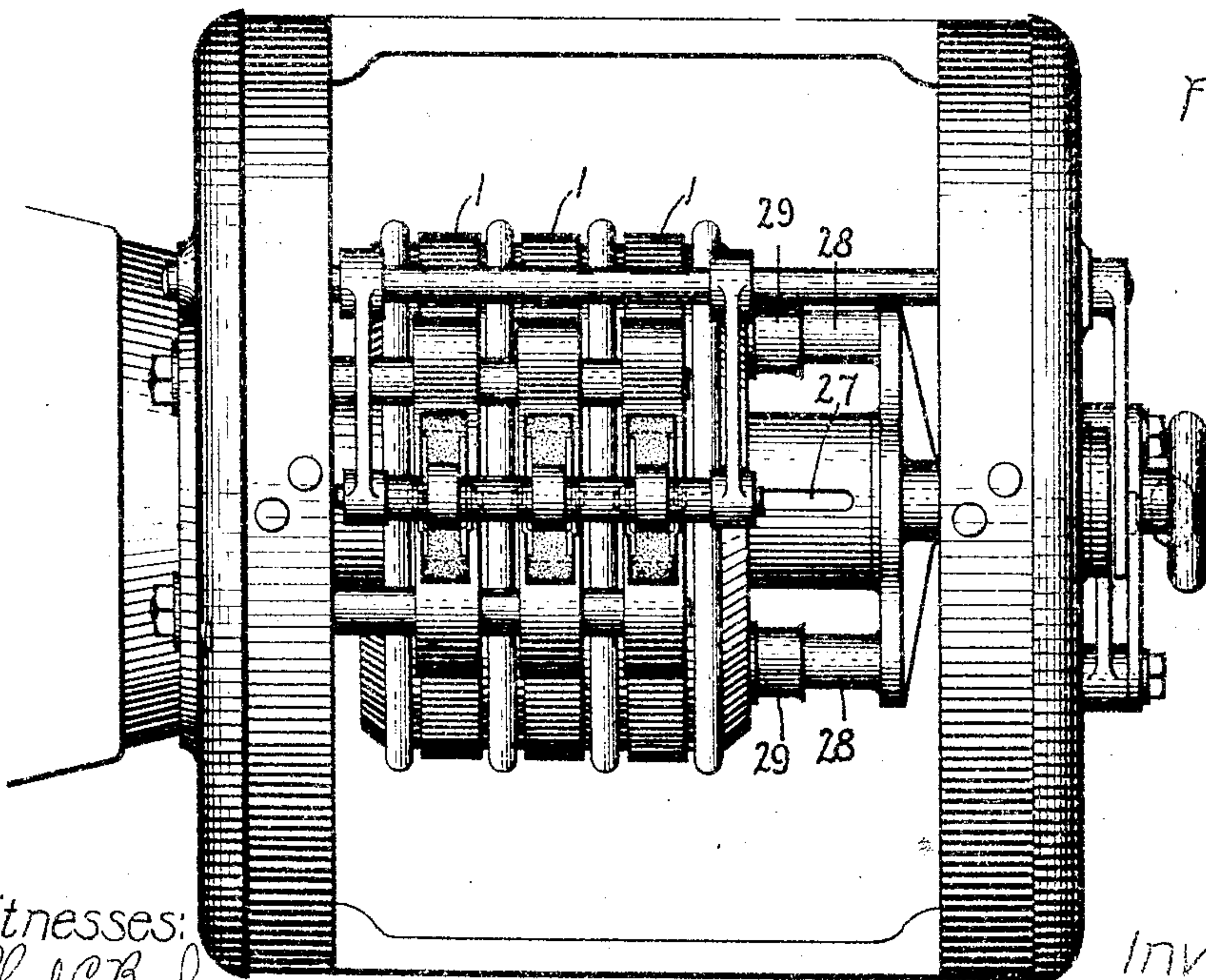
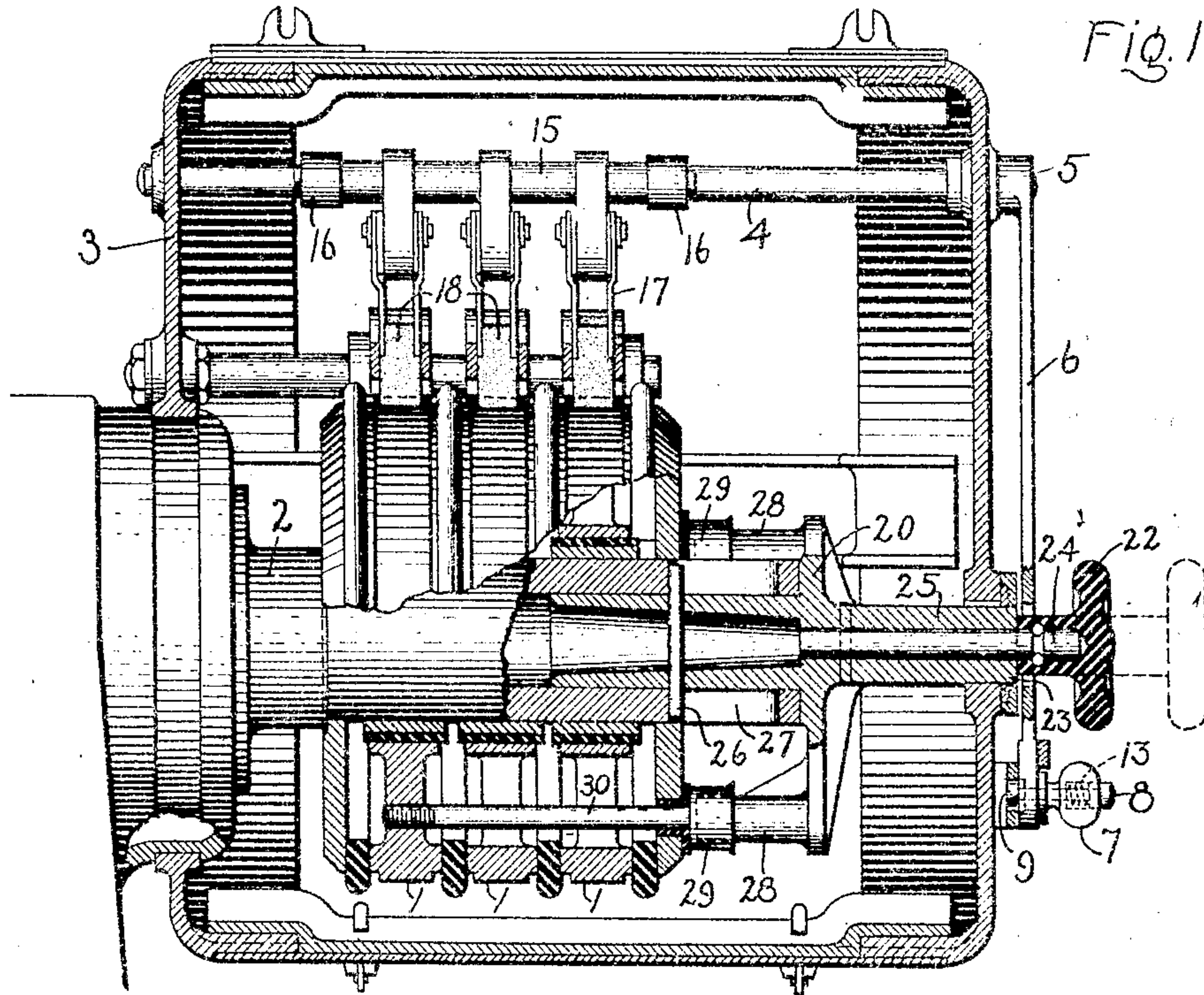


W. F. DAWSON.
DYNAMO ELECTRIC MACHINE.
APPLICATION FILED JULY 15, 1908.

919,547.

Patented Apr. 27, 1909

2 SHEETS—SHEET 1.



Witnesses:

Lloyd C. Bush

J. Ellis Egan

Inventor:

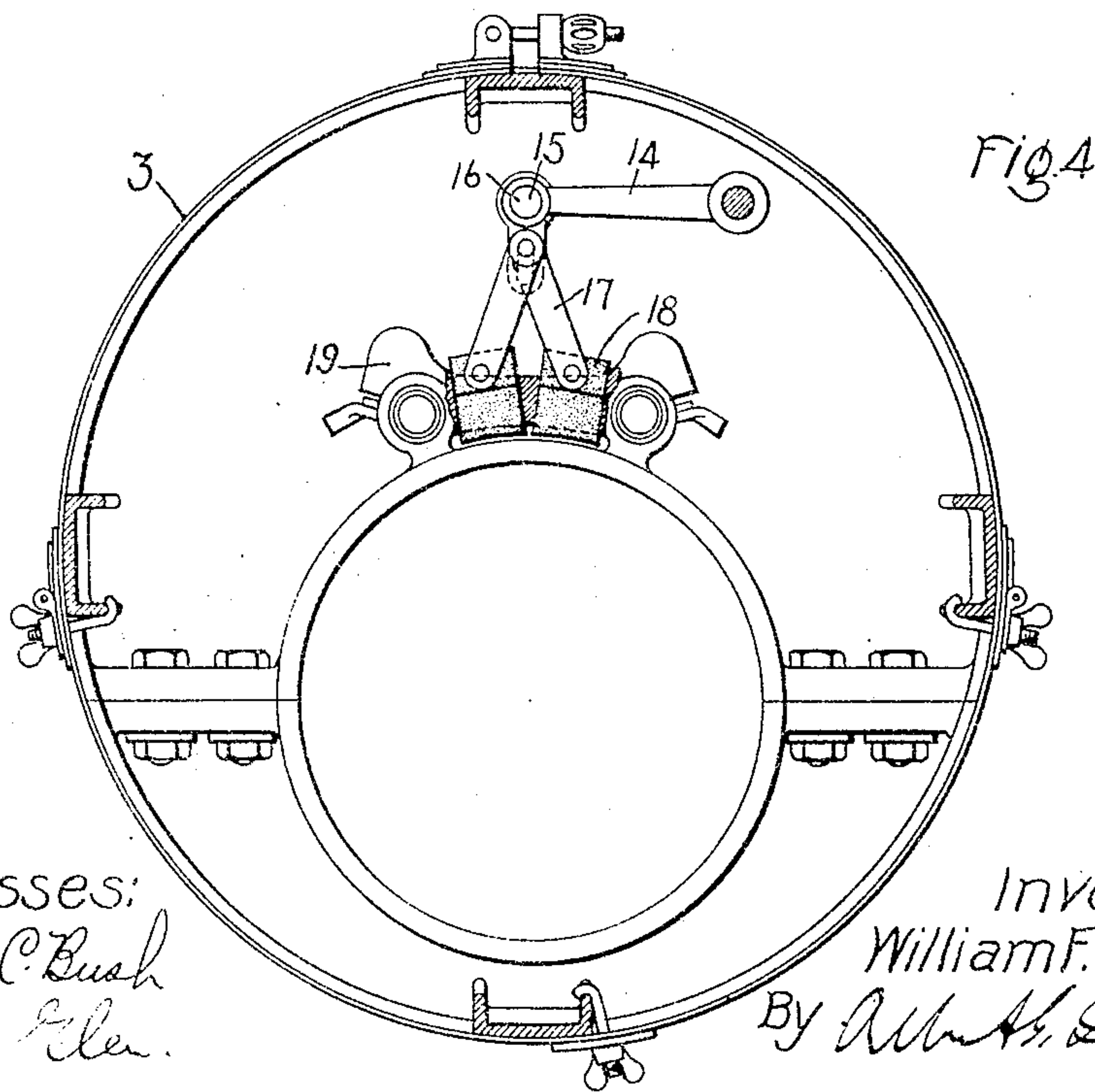
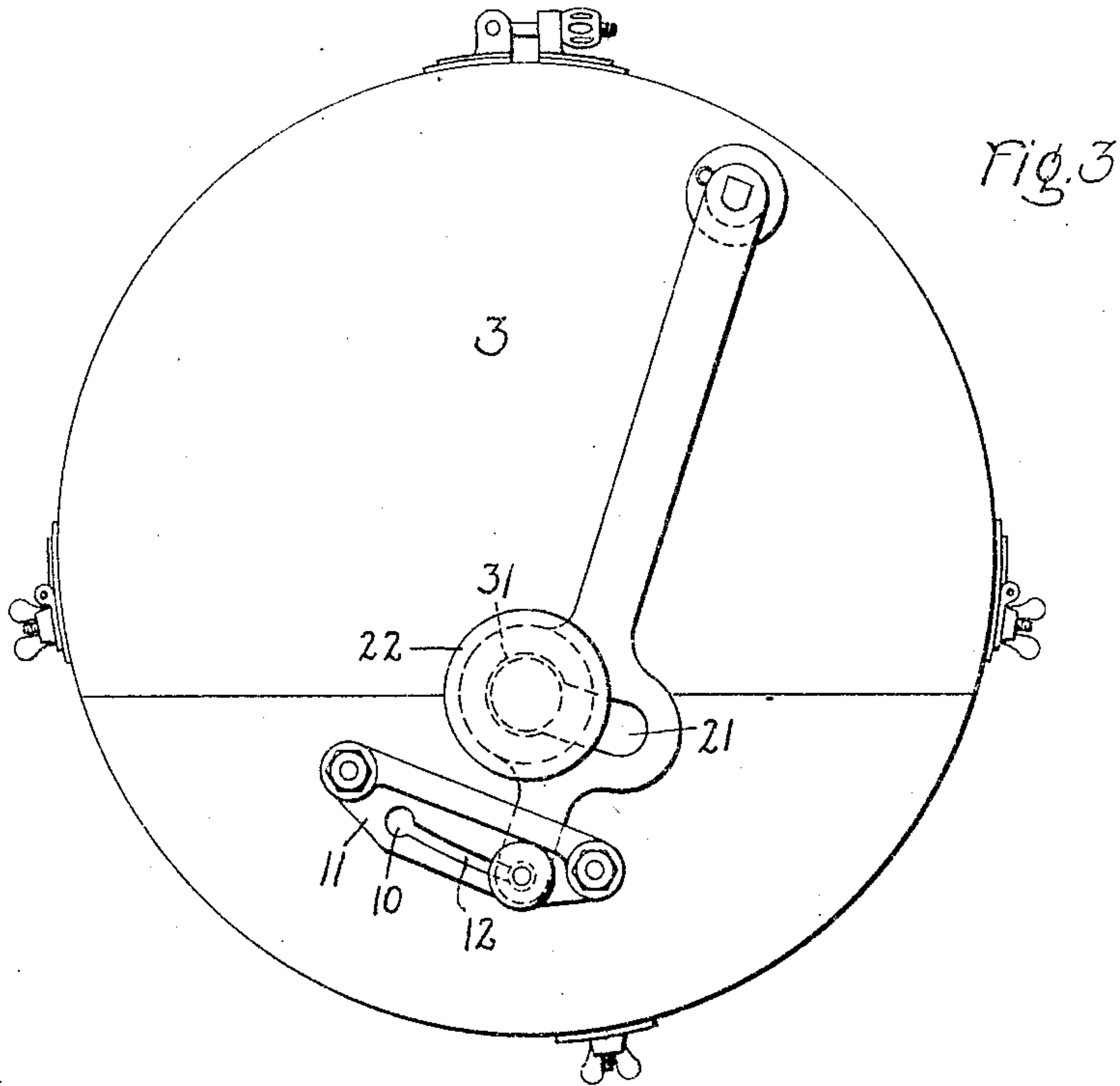
William F. Dawson,

By Albert J. [Signature]

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Witnesses:
Lloyd C. Bush
Willis Allen.

Inventor:
William F. Dawson,
By Albert H. Davis,
Att'y.

UNITED STATES PATENT OFFICE.

WILLIAM F. DAWSON, OF RUGBY, ENGLAND, ASSIGNOR TO GENERAL ELECTRIC COMPANY,
A CORPORATION OF NEW YORK.

DYNAMO-ELECTRIC MACHINE.

No. 919,547.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed July 15, 1908. Serial No. 443,592.

To all whom it may concern:

Be it known that I, WILLIAM F. DAWSON, a citizen of the United States, residing at Rugby, England, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification.

My invention relates to dynamo-electric machines, and more particularly to the current collecting and short-circuiting devices employed in induction motors having coil wound rotors.

The object of my invention is to obviate the loss of energy occurring in the brushes of such machines after the winding has been short-circuited, and also to avoid the wear of the collector rings and brushes caused by the brushes being left in their operative position when not required.

Heretofore, in machines of the above mentioned type, devices have been used for removing the brushes from the collector rings, in which insulating wedges or pins are inserted under the tangential copper brushes so as to lift them out of contact with the rings, and also with some forms of carbon brush holders the brush holders are so mounted that they may be rotated away from the collector rings. The first of these arrangements has necessitated the use of copper brushes which is objectionable, while the second arrangement is subject to the objection that when the brush holders are again returned to their operative positions there is no assurance that they will take up their original positions and bring the brushes into full contact with the slip rings.

My invention consists in providing a brush moving mechanism which will lift the brushes when required in a substantially radial direction from the collector rings without altering the position of the brush holders so that when the brushes are returned into contact with the rings they will at once resume their normal operative positions.

Other features of my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of my invention, however, reference may be had to the following description taken in connection with the accompanying drawing, in which—

Figure 1 is a longitudinal elevation, partly

in section, of a current collecting and short-circuiting device embodying my invention; Fig. 2 is a plan view of the same with the outer casing removed; Fig. 3 is an end elevation; and Fig. 4 is an end view with the end plate of the casing removed.

Referring to the drawings, the collector rings 1 are mounted on the end of the shaft 2, and a casing 3 incloses the collector rings and the brush carrying mechanism. This casing is provided with hinged portions to enable the mechanism to be readily inspected. The brush lifting device is a lever mechanism comprising a lever 6 which is rigidly secured to the end 5 of a rod 4 which has its axis parallel to the axis of the shaft and is journaled in the ends of the casing. The rod 4 is rotated by means of this lever 6. The lever 6 is provided with an operating handle 7 which is adapted to move through a certain arc and to be locked at either end of its movement. The locking mechanism which I have preferred to use comprises a spring-pressed pin 8 projecting from the end of the handle and adapted to be engaged by the hand of the operator. This pin has an enlarged portion 9 at its inner end which projects into an aperture 10 formed in the plate 11 over which the handle 7 moves. The plate is provided at both ends with apertures 10 of the same diameter, the two being joined by an arc-shaped slot 12, the width of which is insufficient to allow the enlarged portion 9 of the pin to pass but sufficient to allow the pin itself to pass through. In order to move the lever 6 the pin must be pressed inwardly so that the enlarged portion 9 passes inward through the plate 11 into the space behind it. The handle can then be moved, with the body of the pin projecting through the arc-shaped slot 12, until it reaches the other end of the slot, when on releasing the pin the spring 13 returns the enlarged portion 9 of the pin into the aperture formed at that end.

The rod 4 has rigidly fixed to it, two or more crank members 14 which are in alignment. An insulating rod 15 is mounted between the outer ends 16 of these cranks. Mounted on the rod 15 are a number of arms 17 to which the brushes 18 are fastened. In my preferred construction these arms 17 are spring-pressed clips which are adapted to be sprung on the brushes 18. The connection

between the insulating rod 15 and the arms 17 is preferably a lost motion one, as is clearly seen in Fig. 4. I have used this lost motion device to allow the brushes to adjust themselves for wear.

When it is desired to remove the brushes from the collector rings, the machine being in operation, the pin 8 projecting from the operating handle is depressed and the operating handle and, consequently, the end of the lever 6 is moved from one end of the arc-shaped slot 12 to the other, thereby causing the rod 4 to rotate carrying with it the cranks 14 and the insulating rod 15. Movement of the lever 6 thus causes the brushes 18 to be lifted out of their holders 19 in a direction substantially radial to the collector rings.

The device which I have shown for short-circuiting the collector rings consists of a contact member 20 which is shown in the form of a cylinder adapted to be inserted or withdrawn from a cylindrical aperture which is formed in the end of the rotor shaft 2. This contact member 20 must rotate with the shaft because of the pin 26 which fits in the slot 27. The contact member 20 has three arms 28 which move in and out of the cup-shaped receptacle 29. Each of these receptacles 29 is bolted to one of the collector rings by means of rods 30. In starting the induction motor this contact member is partially withdrawn until the handle occupies the position shown in dotted lines in Fig. 1 so as to open the short-circuit. When the motor has attained the proper speed, the contact member 20 is inserted to its full extent in the cup-shaped receptacles 29 so as to short-circuit the rotor windings. In order to interlock the short-circuiting device with the brush lifting mechanism, I have provided the lever 6 with a slot 21 through which the handle 22 of the contact member passes. The stem 23 of the contact carrying member which projects through the outer end of the casing is made of two different diameters and when the contacts are short-circuited only a portion 24 which is of smaller diameter projects from the casing. When the contact member is withdrawn the portion 25 of the larger diameter also projects. The slot 21 is enlarged at 31 so as to allow the portion 25 of the stem to pass through it. When the short-circuiting device is in this position it prevents the operating handle of the brush lifting mechanism from being moved. It will thus be seen that when the contact member 20 short-circuits the rotor windings the brushes 18 may be withdrawn and replaced on the collector rings at will, but while they are withdrawn it is impossible for the contact member to be moved so as to break the short circuit because in this position the enlarged portion 25 of the stem of the contact member is in the path of the reduced portion

of the slot 21 in the lever, thus forming a simple and efficient interlock between the two.

I desire it to be understood that my invention is not limited to the particular construction and arrangement described, and I aim in the appended claims to cover all modifications which do not depart from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In combination, a set of rotating collector rings, brushes therefor, brush holders for said brushes, a device for short-circuiting said collector rings, means for moving the short-circuiting device into and out of the position in which it short-circuits the collector rings, and means for moving the brushes into and out of said brush holders in a substantially radial direction.

2. In combination, a set of rotating collector rings, brushes therefor, brush holders for said brushes, a device for short-circuiting said collector rings, means for moving the short-circuiting device into and out of the position in which it short-circuits the collector rings, and means for moving the brushes into and out of said brush holders comprising a rod, crank members fastened to said rod, a second rod mounted between said crank members, and arms to which said brushes are fastened mounted on said second rod.

3. In combination, a set of rotating collector rings, brushes therefor, brush holders for said brushes, a device for short-circuiting said collector rings, means for moving the short-circuiting device into and out of the position in which it short-circuits the collector rings, and means for moving the brushes into and out of said brush holders comprising a rod, crank members fastened to said rod, an insulating rod mounted between said crank members, and arms mounted on said insulating rod by means of a lost motion device, said brushes being fastened to said arms.

4. In combination, a set of rotating collector rings, brushes therefor, brush holders for said brushes, a device for short-circuiting said collector rings, means for moving the short-circuiting device into and out of the position in which it short-circuits the collector rings, means for moving the brushes into and out of said brush holders comprising a rod, a lever attached thereto, crank members fastened to said rod, an insulating rod mounted between said crank members, and arms to which said brushes are fastened mounted on said insulating rod, and interlocking connections between said lever and said means for moving the short-circuiting device so arranged that the brushes can only be removed from the rings when the short-circuiting device is in its operative position.

5. In combination, a set of rotating collector rings, brushes therefor, brush holders for

said brushes, a device for short-circuiting said collector rings, means for moving the short-circuiting device into and out of the position in which it short-circuits the collector rings, means for moving the brushes into and out of said brush holders comprising a rod, a lever attached thereto, crank members fastened to said rod, an insulating rod mounted between said crank members, and arms to which said brushes are fastened mounted on said insulating rod, and interlocking connections between said lever and said means for moving said short-circuiting device so arranged that it is impossible to remove the brushes from said rings while the short-circuiting device is inoperative and also to open the short-circuit while the brushes are removed.

6. In combination, a set of rotating collector rings, brushes therefor, brush holders for said brushes, a device for short-circuiting said collector rings, means for moving the short-circuiting device into and out of the position in which it short-circuits the collector rings, and means for moving the brushes into and out of said brush holders comprising a rod, a lever attached thereto, means for limiting the movement of said lever, crank members fastened to said rod, an insulating rod mounted between said crank members, and arms to which said brushes are fastened mounted on said insulating rod.

7. In combination, a set of rotating collector rings, brushes therefor, brush holders for said brushes, a device for short-circuiting said collector rings, means for moving the short-circuiting device into and out of the position in which it short-circuits the collector rings, and means for moving the brushes into and out of said brush holders comprising a rod, a lever attached thereto, means for limiting the movement of said lever, means

for locking said lever at either end of its movement, crank members fastened to said rod, an insulating rod mounted between said crank members, and arms to which said brushes are fastened mounted on said insulating rod.

8. In combination, a set of rotating collector rings, brushes therefor, brush holders for said brushes, a device for short-circuiting said collector rings comprising a contact member having a stem with portions of two different diameters, and a lever mechanism for moving the brushes into and out of said brush holders, the lever of said mechanism having a slot enlarged at one end allowing the portion of the stem having the larger diameter to pass through, thereby preventing the movement of said lever to lift the brushes when said stem is in this position.

9. In combination, a set of rotating collector rings, brushes therefor, brush holders for said brushes, a device for short-circuiting said collector rings comprising a contact member having a stem with portions of two different diameters, means for moving the brushes into and out of said brush holders comprising a rod, a lever attached thereto, crank members fastened to said rod, a second rod mounted between said crank members, and arms to which said brushes are fastened mounted on said second rod, said lever having a slot enlarged at one end allowing the portion of the stem having the larger diameter to pass through it, thereby preventing the movement of said lever to lift the brushes when said stem is in this position.

In witness whereof, I have hereunto set my hand this 25th day of June, 1908.

WILLIAM F. DAWSON.

Witnesses:

CHARLES H. FULLER,
J. A. FOSTER.