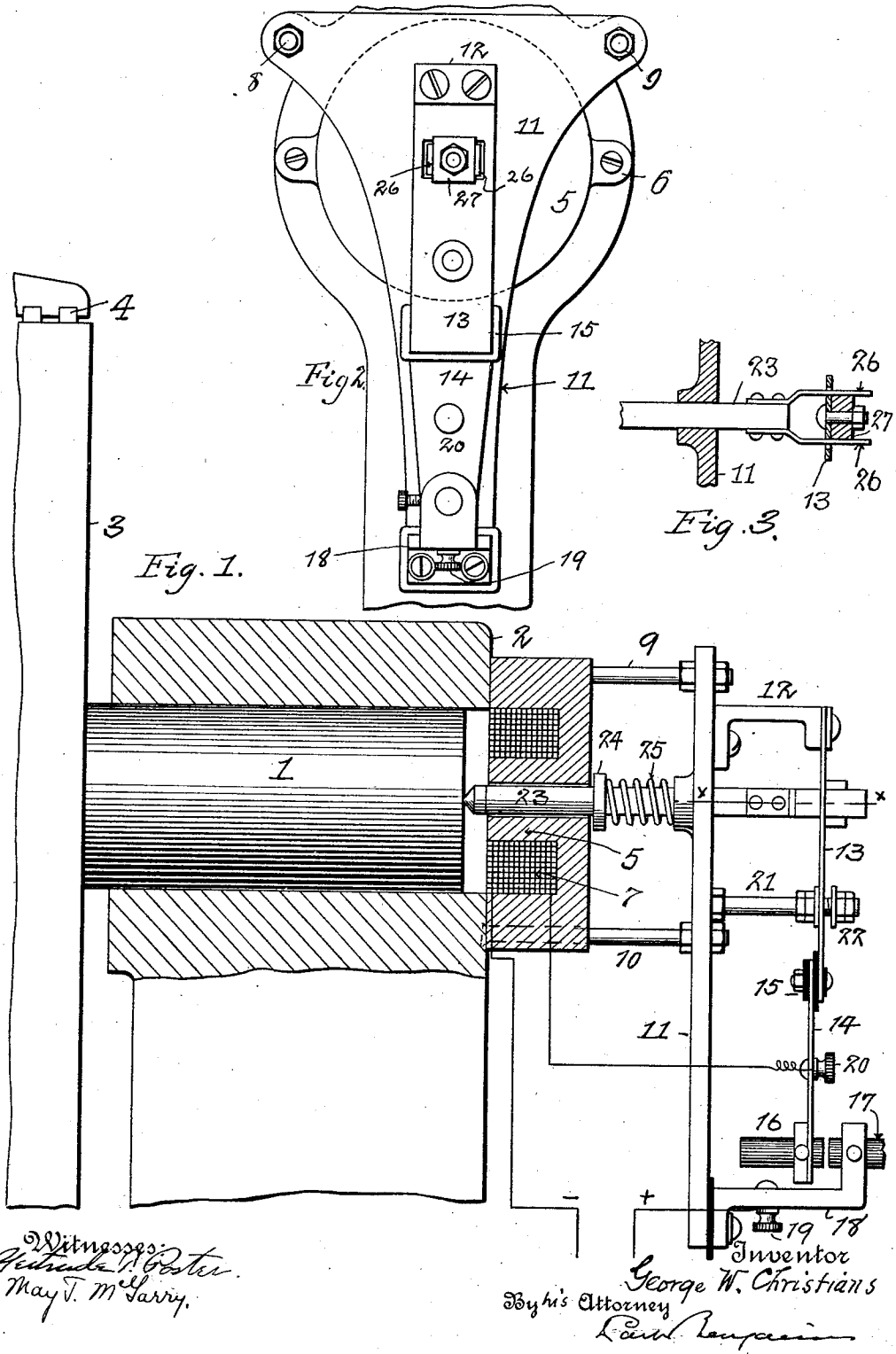
G. W. CHRISTIANS.

END PLAY DEVICE.

APPLICATION FILED JAN. 30, 1913.

1,067,864. Patented July 22, 1913.



COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE W. CHRISTIANS, OF NEW YORK, N. Y., ASSIGNOR TO THOMAS E. MURRAY, OF NEW YORK, N. Y.

END-PLAY DEVICE.

1,067,864. Specification of Letters Patent. Patented July 22, 1913.

Application filed January 30, 1913. Serial No. 745,059.

To all whom it may concern:

Be it known that I, GEORGE W. CHRISTIANS, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in End-Play Devices, of which the following is a specification.

The invention is a device for amplifying the normal reciprocating movement of a rotating shaft.

The device is more especially designed for application to the shaft of a dynamo, converter, or the like, wherein stationary contacts, such as brushes or commutator rings, bear upon circumferential contacts on a rotary member carried by said shaft.

The object is to utilize the normal reciprocation of the shaft constantly to move the rotating contacts transversely to and fro under the stationary contacts and so to distibute the wear over a large area of surface, thus preventing the formation of channels or grooves in said rotating contacts.

In the accompanying drawings—Figure 1 shows my device in side elevation applied to a rotating shaft, the shaft bearing and the electro-magnet being exhibited in section. Fig. 2 is an end elevation. Fig. 3 is a horizontal section of the frictional connection between rod and switch lever on the line x, x of Fig. 1.

Similar numbers of reference indicate like parts.

1 is a rotating shaft of a dynamo, converter, or the like, supported in bearing 2 and carrying the rotary contact member 3, (shown in part) on the periphery of which bear the stationary contacts 4.

5 is the tubular core of an electro-magnet, secured to the outer face of bearing 2, by lugs 6 and screws. The coil 7 is countersunk in the core, and is preferably of the same outside diameter as shaft 1.

Supported on standards 8, 9, 10, extending outwardly from the face of bearing 2, is a plate 11. Near the top of said plate is a bracket 12, carrying a spring switch lever made in two parts, 13 and 14, connected together and mutually insulated at 15. Said lever at its lower end carries a contact 16, preferably of carbon, which coöperates with a similar contact 17 in bracket 18 secured to plate 11 and insulated therefrom. The circuit proceeds to binding post 19, bracket 18, contacts 17, 16, part 14 of the switch lever, binding post 20, magnet coil 7, and so to return. A post 21 is secured to plate 11 and passes through a slot in part 13 of the switch lever. Said post is threaded to receive nuts 22 on each side of said lever, which serve as adjustable stops, limiting the movement thereof. A rod 23 passes through the tubular magnet core, and also through plate 11. The inner extremity of said rod bears against the center of shaft 1. Outside of the magnet core said rod carries a collar 24, between which and plate 11 is interposed a helical spring 25. To the outer end of rod 23 are secured two parallel spring arms 26 which pass through openings in the part 13 of the switch lever and bear against the opposite sides of a block 27, which may be of wood, bolted to the front side of said lever.

The operation of the device is as follows: Assume the parts to be in the position shown in Fig. 1, and the shaft to move toward the electro-magnet. The friction between arms 26 and block 27 is sufficient to cause the switch lever to be moved at once in the same direction, thus closing the contacts 16, 17. The magnet coil 7 then being energized, attracts shaft 1 and assists the movement of said shaft. The shaft in moving compresses helical spring 25. The arms 26 slide over block 27. When shaft 1 moves away from the magnet, the spring 25, expanding, causes rod 23 to press on the end of said shaft and so to assist its movement, while the frictional engagement of arms 26 with block 27 is sufficient immediately to open the contacts 16, 17, thus deënergizing the magnet. It will thus be seen that the normal movement of the shaft toward the magnet at once closes circuit to the magnet which attracts the shaft. At the same time, the helical spring is compressed, storing up a part of the power of the moving shaft. The return movement of the shaft instantly breaks circuit to the magnet, so that the expanding spring then utilizes its stored power to push the shaft in the opposite direction. Energy is thus supplied to the rotating shaft on both its forward and back reciprocating strokes, which, although small in amount, is sufficient to keep the shaft in constant to and fro vibration; the to and fro movement of the shaft being somewhat analogous to that of a pendulum under the external impulses

periodically imparted to it by a clock-mechanism.

I claim:

1. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, means controlled by said shaft for subjecting the same to an external impulse always in the direction of its normal longitudinal motion.

2. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, means controlled by said shaft for subjecting the same to an external impulse always in the direction and at the beginning of its normal longitudinal motion.

3. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, means controlled by said shaft for magnetically attracting said shaft while its normal motion is toward said attractive means, means for accumulating a part of the energy of said movement and for restoring the same during the return travel of said shaft, and means for deënergizing said attractive means upon the beginning of said return travel.

4. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, an electro-magnet facing the end of said shaft, a spring, a switch in circuit with said magnet, and means controlled by said shaft in moving toward said magnet for compressing said spring and closing circuit to said magnet.

5. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, an electro-magnet facing the end of said shaft, means controlled by said shaft in moving toward said magnet for closing circuit to said magnet, and means controlled by said shaft in moving in the opposite direction for opening said circuit.

6. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, an electro-magnet facing the end of said shaft, a switch in circuit therewith, a slidably supported rod in frictional engagement with the moving member of said switch, and resilient means for holding said rod in contact with said shaft end: the said shaft in moving toward said magnet operating said rod and switch to close circuit to said magnet.

7. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, a switch, a loose rod reciprocated by said shaft and extending through and in frictional contact with the movable member of said switch, and an electro-magnet facing the end of said shaft and in circuit with said switch: the said shaft in moving toward said magnet operating said rod and switch to close circuit to said magnet.

8. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, an electro-magnet having a tubular core, a switch in circuit with said magnet, a rod slidable in said core and in frictional engagement with the movable member of said switch, and a spring opposing the movement of said rod to close said switch.

9. A device for amplifying the reciprocating motion of a rotating shaft, comprising a shaft, an electro-magnet having a tubular core, a switch in circuit with said magnet, a rod slidable in said core and extending through and in frictional contact with the movable member of said switch, and a spring opposing the movement of said rod to close said switch.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGE W. CHRISTIANS.

Witnesses:

GERTRUDE T. PORTER,

MAY T. MCGARRY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."