

(No Model.)

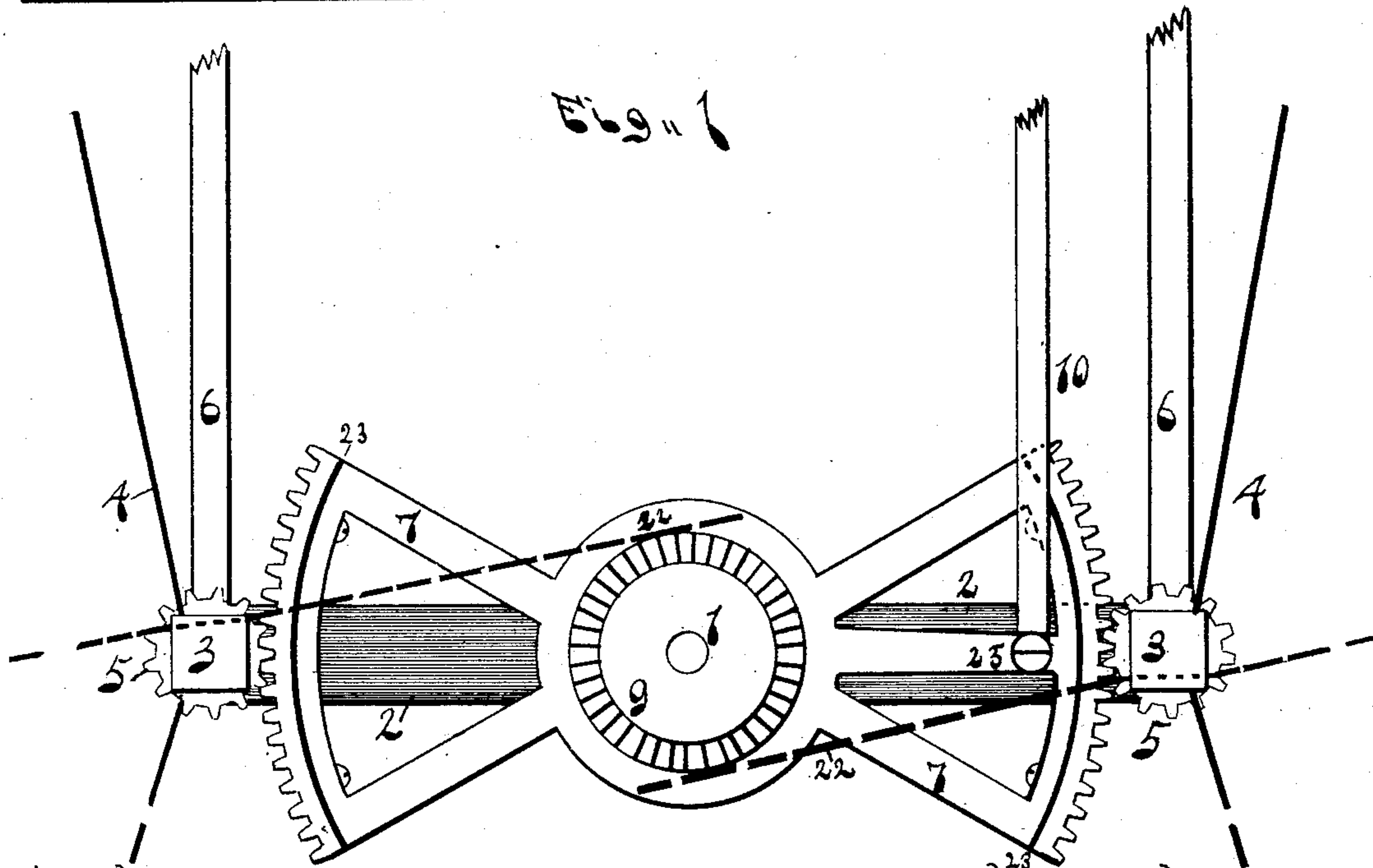
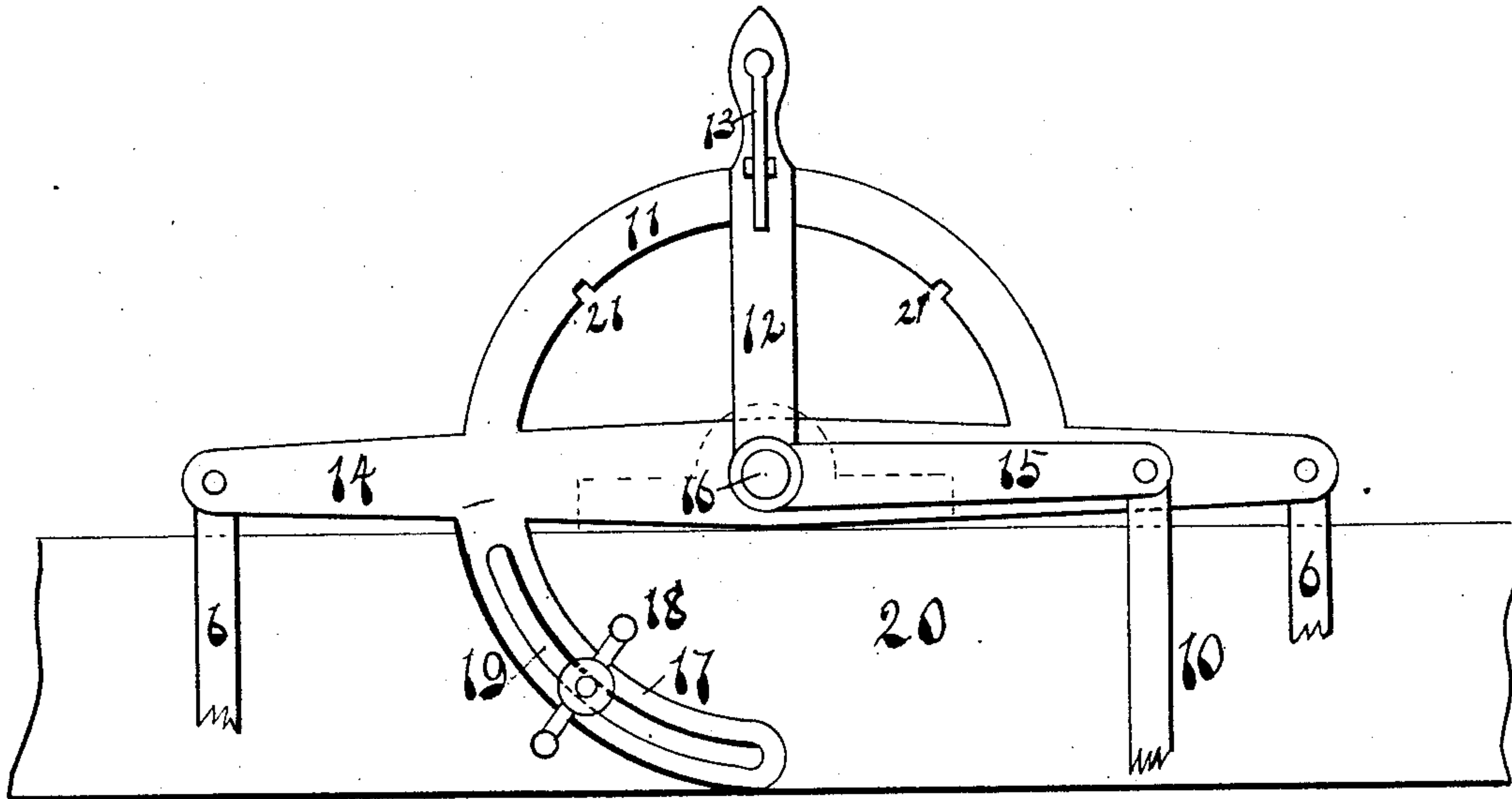
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F. E. FISHER.

REVERSING MECHANISM FOR ELECTRIC MOTORS.

No. 371,443.

Patented Oct. 11, 1887.



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C. M. Mason,

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Inventor

Frank E. Fisher

by

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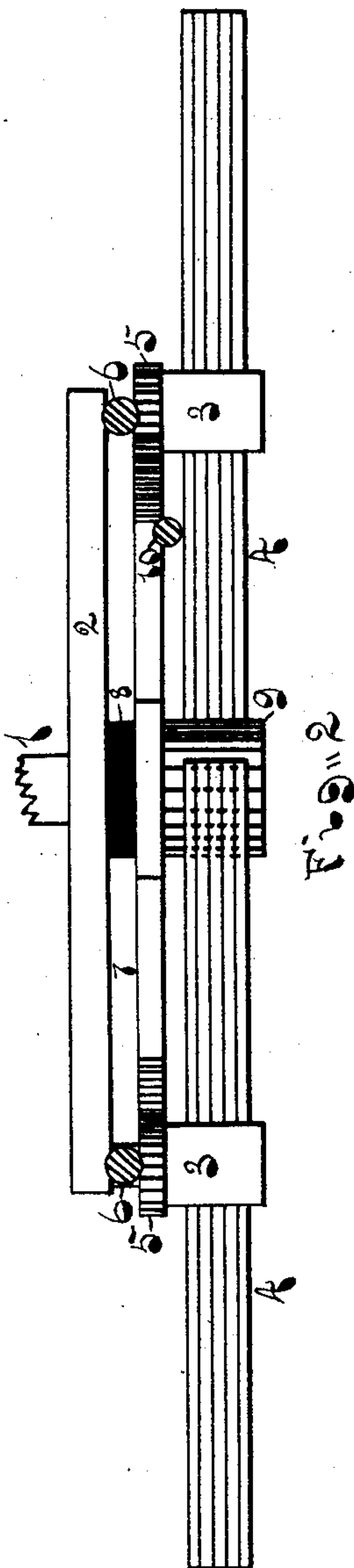
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UNITED STATES PATENT OFFICE.

FRANK E. FISHER, OF DETROIT, MICHIGAN.

REVERSING MECHANISM FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 371,443, dated October 11, 1887.

Application filed December 13, 1886. Serial No. 221,425. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. FISHER, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Reversing Mechanism for Electric Motors, of which the following is a specification.

My invention consists in apparatus for reversing and regulating electric motors, principally designed for use in cars driven by such motors, and is hereinafter fully described.

Figure 1 is an end elevation showing the end of the armature-shaft and commutator and the attachments of my apparatus, and Fig. 2 is a plan view of the lower part of Fig. 1.

1 represents the armature-shaft of an electric motor of any known type, and 9 represents the commutator carried on said shaft.

2 represents a cross-bar pivoted on the armature-shaft, but insulated therefrom, or, if preferred, pivoted on any other support concentric with said armature-shaft.

3 3 represent the brush-holders, to which are connected the ends of the circuit in any convenient manner.

5 5 represent two pinions journaled in cross-bar 2, at the ends thereof, to which are respectively fastened the brush-holders 3.

4 4 represent the commutator-brushes. These are made in the usual manner; but I usually make them of double length, as shown in Fig. 2—that is, extending each way from the brush-holder far enough to come in contact with the commutator—their position when in contact with the commutator being indicated by the dotted lines 22 22. When made of the ordinary length, the brush-holder must rotate farther to reverse the position of the brushes on the commutator than when made as illustrated.

7 7 represent two toothed sectors sleeved on the armature-shaft and insulated therefrom, and so proportioned that their teeth mesh, respectively, with the pinions 5 5. I also insulate the teeth of said sectors 7 from the body by the lines of insulating material shown at 23.

20 represents a fixed beam above the motor, which may be one of the sills of the car when the motor is below the car, but is usually a frame-work at a convenient height to bring the reversing-lever within easy reach of the driver.

16 represents a shaft, which may be either loose or stationary, secured to beam 20.

14 represents a cross-bar sleeved loosely on shaft 16, and provided with a slotted arc, 17, having therein a slot, 19, embracing a set-screw, 18, secured to beam 20, by which cross-bar 14 can be locked to beam 20 in any desired position within the range of arc 17.

6 6 represent connecting-rods, pivoted to the ends of cross-bar 14 and of cross-bar 2, so that said cross bars are held at all times parallel and cross-bar 2 can be moved by moving cross-bar 14.

12 and 15 represent the two arms of a bell-crank lever, which is pivoted on shaft 16. The end of arm 15 is connected with the sectors 7 by the pivoted connecting-rod 10, which is pivoted to the sector-frame at 25.

11 represents a semicircle secured to the upper side of cross bar 14 and provided with notches 21.

13 represents an ordinary spring-bolt set in arm 12 and adapted to lock said arm to semicircle 11 at will in the same manner as the reversing-lever of a locomotive is locked.

The operation of my invention is as follows: Supposing the commutator-brushes to lie upon the commutator in the position shown by dotted lines 22 and the armature running in the direction due to such position of the brushes, if the driver desires to reverse the motor he unlocks spring-bolt 13 and forces arm 12 to the right of the drawings, which presses arm 15 and, through connecting-rod 10, actuates the two sectors 7. These rotate pinions 5 and with them brush-holders 3, and when the brush-holders have gone through a little less than one-half a revolution the position of their respective brushes on the commutator will be reversed, that which was formerly on top of the commutator now being underneath, whereby the polarity of the armature is changed and its direction of rotation reversed.

If the driver desires to simply increase or decrease the speed of the armature, he loosens said screw 18, leaving arm 12 locked to semicircle 11, and moves cross-bar 14 in one direction or the other, whereby, through connecting-rods 6, cross-bar 2 is swung in the same direction, carrying with it brush-holders 3,

and changing the point on the commutator at which the commutator-brushes make contact, thus regulating the speed of the armature in a manner well known to electricians. It is thus
5 obvious that by moving the lever 12 when not locked to semicircle 11 the driver can reverse the motor, and that by moving the same lever when locked to semicircle 11 the driver can regulate the speed of the motor.

10 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an electric motor, brush-holders rotatable on their axes and each carrying a brush projecting on both sides of the holder, whereby
15 rotating the brush-holder presents the opposite ends of the brush to the commutator, and means for rotating the brush-holders, substantially as shown and described.

2. A reversing gear for electric motors, consisting of two rotatable brush-holders each carrying a brush which projects from each side of the holder far enough to make contact with

the commutator, and means for rotating the brush-holders on their axes, whereby each brush may be presented to opposite sides of
25 the commutator at will, substantially as and for the purposes described.

3. In an electric motor, two rotatable brush-holders each carrying a brush secured thereto at or near its center, a movable support concentric with the armature-shaft and carrying
30 said brush-holders, mechanism, substantially such as described, for moving the brush-holder support and for rotating the brush-holders, and an operating-lever rigidly connected with
35 the brush-rotating mechanism and detachably connected with the brush-moving mechanism, whereby the brushes can be moved without rotating or rotated by a single lever, substantially as shown and described.

FRANK E. FISHER.

Witnesses:

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C. M. MASON.