No. 654,142. Patented July 24, 1900.

G. S. DUNN.

BRAKE.

(Application filed Oct. 31, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

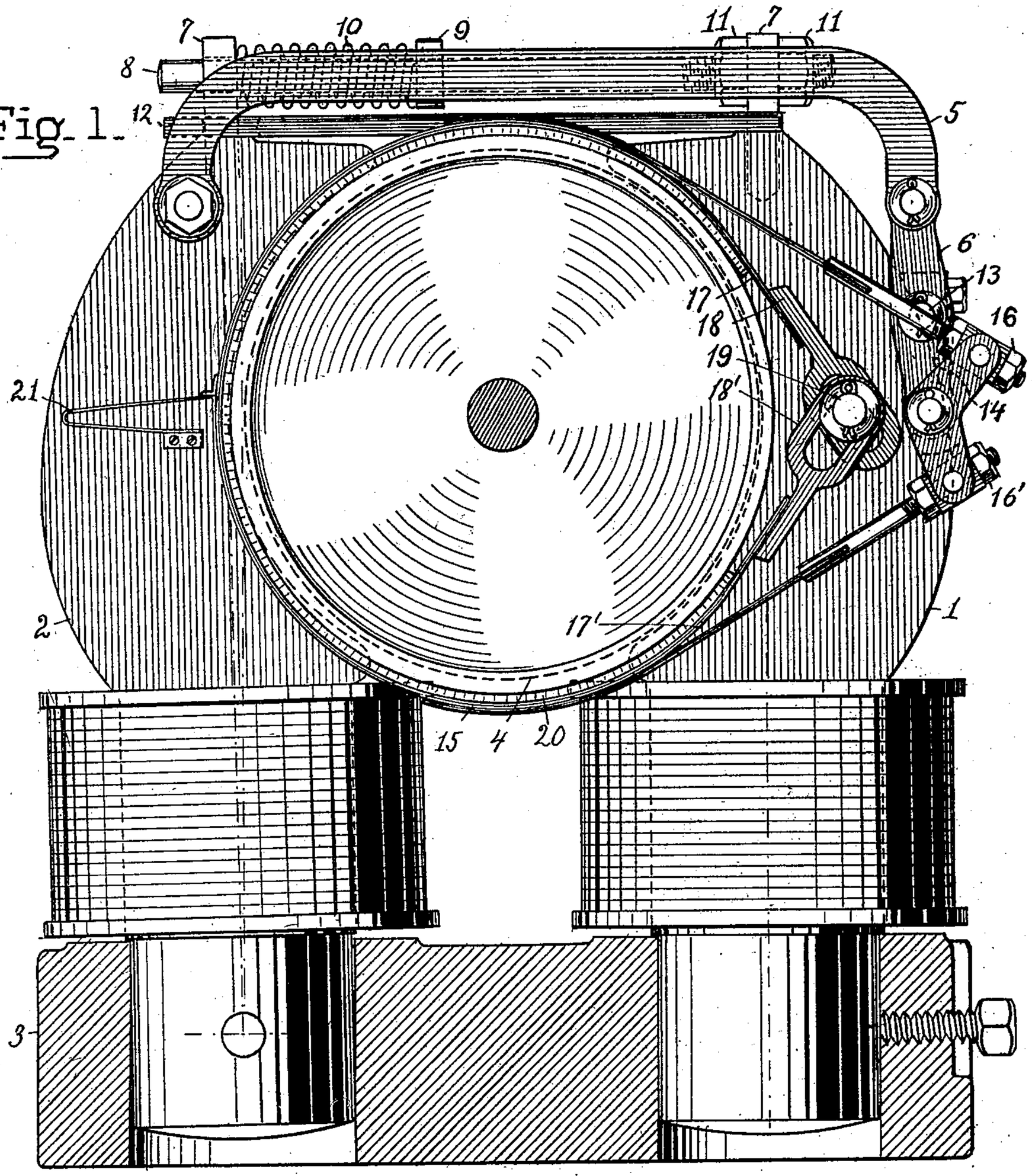

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Fig. 2.

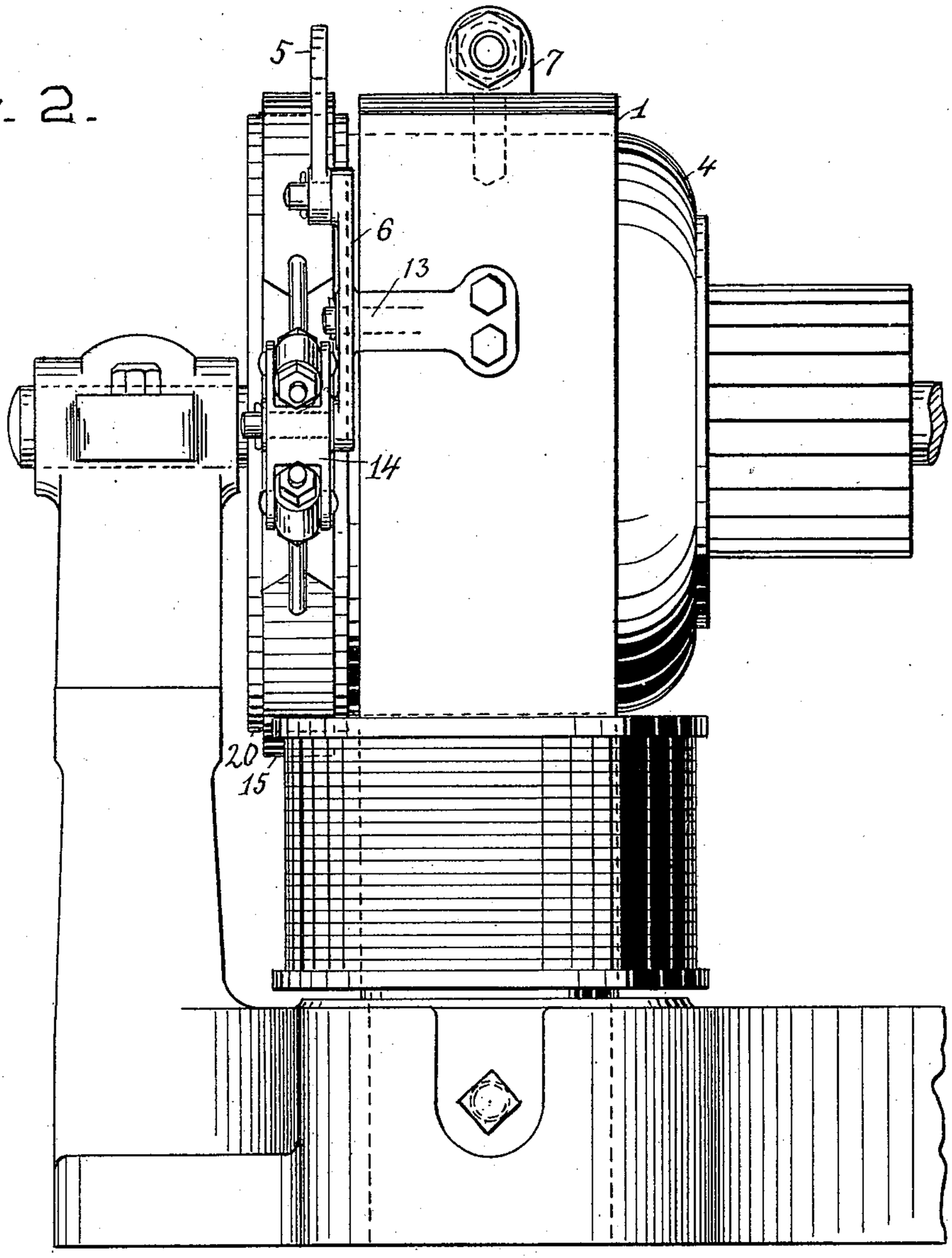

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Fig. 3.

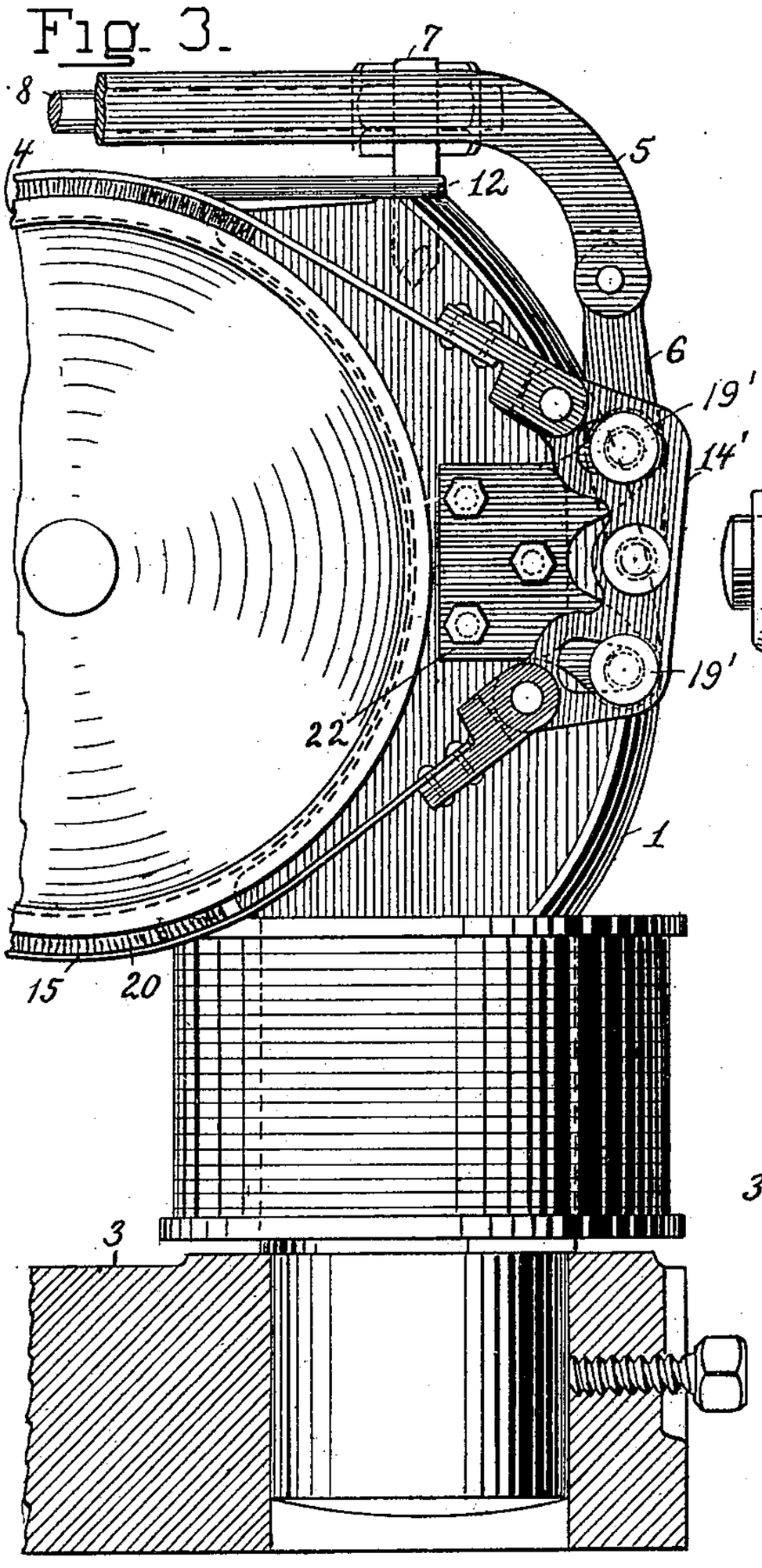
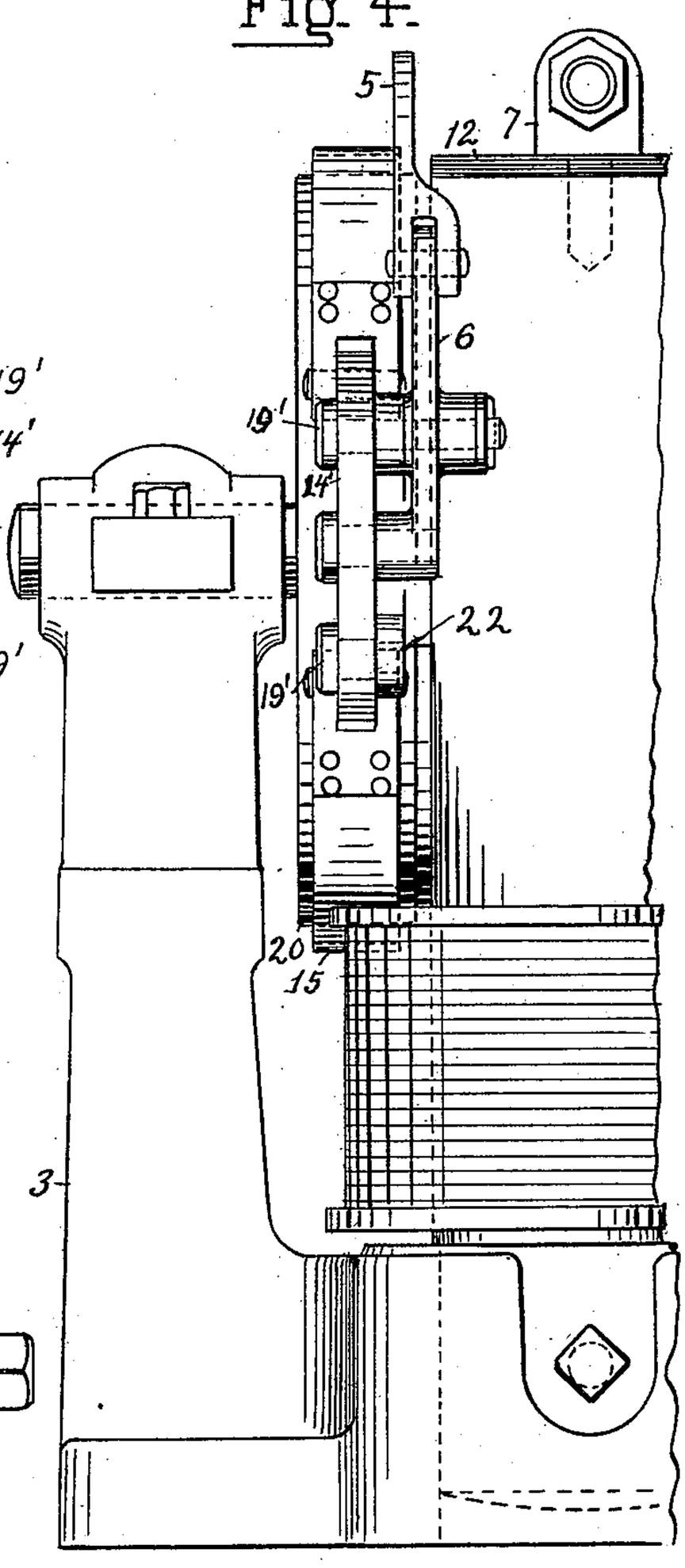


Fig. 4.



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UNITED STATES PATENT OFFICE.

GANO S. DUNN, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO THE CROCKER-WHEELER COMPANY, OF NEW JERSEY.

BRAKE.

SPECIFICATION forming part of Letters Patent No. 654,142, dated July 24, 1900.

Application filed October 31, 1899. Serial No. 735,419. (No model.)

To all whom it may concern:

Be it known that I, GANO S. DUNN, a citizen of the United States of America, and a resident of East Orange, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Brakes, of which the following is a specification.

My invention as herein illustrated is an improvement in the style of automatic electromagnetic brake disclosed in my United States Letters Patent No. 515,755, dated March 6, 1894; but the principle of the brake is applicable no matter how it is actuated or to what it is applied, and therefore I do not limit myself to the means for actuating it described and claimed in said patent, nor to applying it to armatures.

The essential feature of the present invention is that the brake, operating upon the cumulative principle, is applied with equal force in whichever direction the armature or other moving part to be checked or stopped is revolving.

With this object in view the invention consists in a brake provided with a brake-strap, means for anchoring the brake-strap at either end, and means for applying it by a pull at the other end, the brake being adjusted automatically to determine of itself which end shall be anchored and which end shall be pulled, so that the braking effect shall be independent of the direction of rotation of the brake-wheel; and the invention further consists in certain details hereinafter specifically described and claimed.

Referring to the drawings which form a part of this specification, Figure 1 is an end view, partly in section, of a motor with a form of strap-brake in which there are two branches at each end of the strap, one of which is connected to an anchor-stud and the other of which is connected, through an equalizing-lever, to a brake-applying mechanism. Fig. 2 is a side view of the same. Fig. 3 is an end view, partly in section, of part of a motor with a modified form of strap-brake, the two ends of which are connected to the equalizing-lever, and anchor-studs are provided at the ends of the equalizing-lever. Fig. 4 is a side view of the motor with this modified form of strap-brake.

The brake, in the construction shown herein, is applied by a movable part which is an essential portion of the normal magnetic circuit of the dynamo or motor as this term is explained in my said Letters Patent. This movable part is preferably a pole-piece. In the machine illustrated one of the pole-pieces 1 is rigidly fixed and the other pole-piece 2 is mounted in the base 3 of the machine on a pivot, so that it can move slightly toward and from the armature 4. It will be observed that the hole in the base into which the movable pole-piece is set is slightly tapered from both ends to permit the pole-piece to move slightly on its pivot to and from the armature. At the top of this pole-piece there is attached a bent rod 5, on which operates the brake-lever 6, as will be described later on. The brake is spring-controlled, there being on the top of each of the pole-pieces a stud 7, between which is mounted a rod 8, that extends from one pole-piece to the other. This rod is provided with a collar 9, which is pinned at a suitable point between its ends, depending on the length of the spring desired. The spring 10 is slipped over the rod between this collar and one of the studs, (as shown the stud on the movable pole-piece,) the rod being free to slide in the stud on this pole-piece. The other end of the rod is threaded, and a nut 11 is turned on at each side of the stud on the fixed pole-piece, whereby the tension of the spring can be regulated. A brass plate 12 is provided on the top of the pole-pieces, through which the studs above referred to pass, the plate being slotted at one of the studs just sufficiently to admit of the necessary play. This plate therefore acts as a stop for the movable pole-piece, so as to prevent the pole-piece from being drawn against the armature.

The brake-lever, to which the free end of the bent rod is connected, is pivoted on a pin 13, mounted on the fixed pole-piece. On the lower end of this lever an equalizing-lever 14 is mounted. The brake-strap 15 is divided at each end into two branches. One branch 16 16′ at each end is connected rigidly but ad-

justably to an end of the equalizing-lever. The other branch 17 17′ at each end terminates in an elongated eye or stirrup 18 18′, which fits over an anchor-stud 19, mounted on the fixed pole-piece of the machine.

The brake is applied by the spring 10 when current is turned off from the machine and the magnetization ceases to attract the pole-pieces toward the armature. The movable pole-piece is then thrown outward by the spring and pulls the bent rod. This pulls the upper end of the brake-lever toward the armature and throws out its lower end. Through the equalizing-lever, pivoted to the lower end of the brake-lever, an equal pull is exerted on both ends of the brake-strap through the branches 16 16′, attached to the ends of the equalizing-lever. This brings the brake-strap in frictional contact with the brake-wheel, thus applying the brake. If when the brake is applied the armature is running in a clockwise direction as viewed from the end shown in Fig. 1, the first effect will be to carry the strap with the brake-wheel a slight distance in the same direction and pull the stirrup 18′, which is attached to one of the branches from the lower end of the brake-strap, tight against the anchor-stud, and the other stirrup 18 will be eased off. The lower end of the brake-strap will then be fixed and the branch 16′ from this end will stop further outward movement of the lower end of the equalizing-lever, since the end of the brake-strap to which it is attached is held against the anchor-stud by a greater power in the opposite direction. Further movement of the brake-lever will then pull only the branch 16 from the upper end of the brake-strap, and the brake will be applied in proportion to the pull on this branch. Owing to the snubbing action the friction will be cumulative and the braking effect will be much greater than that which would result directly from the power applied. This results from having one end of the strap anchored and the strap wound around the brake-wheel in the direction of rotation and pulled at the other end.

If the armature is rotating in a counter-clockwise direction and the brake is applied, the first effect after the strap is drawn against the brake-wheel will be a slight movement of the brake-strap in the direction of rotation, which will pull the stirrup 18, which is attached to one of the branches from the upper end of the brake-strap, tight against the anchor-stud. The upper end of the brake-strap will then be fixed and further movement of the brake-lever will then pull only the branch 16′ from the lower end of the brake-strap, and the brake will be applied in proportion to the pull on this branch with cumulative effect, the same as in the case of clockwise rotation.

When the brake is released, the natural spring in the brake-strap causes it to expand to a larger diameter than the brake-wheel and one side will be supported by the anchor-stud. On the opposite side a spring 21 supports the strap. This spring is of just sufficient tension to balance the weight of the strap, but has sufficient range of movement to allow the strap to adjust itself to the brake-wheel according to the direction of rotation.

Figs. 3 and 4 illustrate a way in which the same result is obtained without branching the ends of the strap. In this form the ends are attached to the equalizing-lever 14′, which is of slightly-different shape, although operating as before. Slots are formed in the ends of this lever and play over anchor-studs 19′. These studs are supported on arms from a bracket 22, which is fastened to the fixed pole-piece of the machine. The upper anchor-stud also serves as a fulcrum-pin for the brake-lever. When the armature is revolving in a clockwise direction, the lower end of the equalizing-lever rests against the lower anchor-stud, and the lower end of the strap is thereby anchored, while the upper end is pulled by the upper end of the equalizing-lever. When the armature is revolving in a counter-clockwise direction, the upper end of the equalizing-lever rests against the upper anchor-stud, and the upper end of the strap is thereby anchored, while the lower end is pulled by the lower end of the equalizing-lever.

It will be seen that, in effect, the end of the strap which is anchored and the end which is pulled are reversed with the reversal of the armature rotation, with the result that the brake is a cumulative brake in both directions, the braking effect being independent of the direction of revolution of the brake-wheel. It is believed to be broadly new to adjust the strap by means actuated by the brake-wheel to determine which end shall be anchored and which end pulled, so that the strap shall be wound around the brake-wheel in the direction in which it is revolving.

It will be clear therefore that many changes may be made without departing from the spirit of my invention.

Without limiting myself to the precise details shown, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination in a brake of a brake-wheel, a brake-strap to be applied thereto, means for anchoring the strap at either end and means for applying it by a pull at the other end actuated by the brake-wheel for adjusting the strap to determine which end shall be anchored and which end shall be pulled, so that its braking effect shall be independent of the direction of revolution of the brake-wheel, substantially as described.

2. The combination in a brake of a brake-wheel, a brake-strap to be applied thereto, an equalizing-lever to which the ends of the brake-strap are attached, means for anchoring the strap at either end and means for applying it at the other end by a pull through

the equalizing-lever actuated by the brake-wheel for adjusting the strap to determine which end shall be anchored and which end shall be pulled, so that its braking effect shall be independent of the direction of revolution of the brake-wheel, substantially as described.

3. A brake-strap provided with two branches at each end, one branch at each end being provided with a stirrup, substantially as described.

Signed by me in the borough of Manhattan, New York city, New York, this 27th day of October, 1899.

GANO S. DUNN.

Witnesses:
SAMUEL W. BALCH,
ANSON BALDWIN.