No. 821,504. PATENTED MAY 22, 1906.

P. KENNEDY.

RETARDING DEVICE FOR ELECTROMAGNETS.

APPLICATION FILED FEB. 13, 1905. RENEWED OCT. 21, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

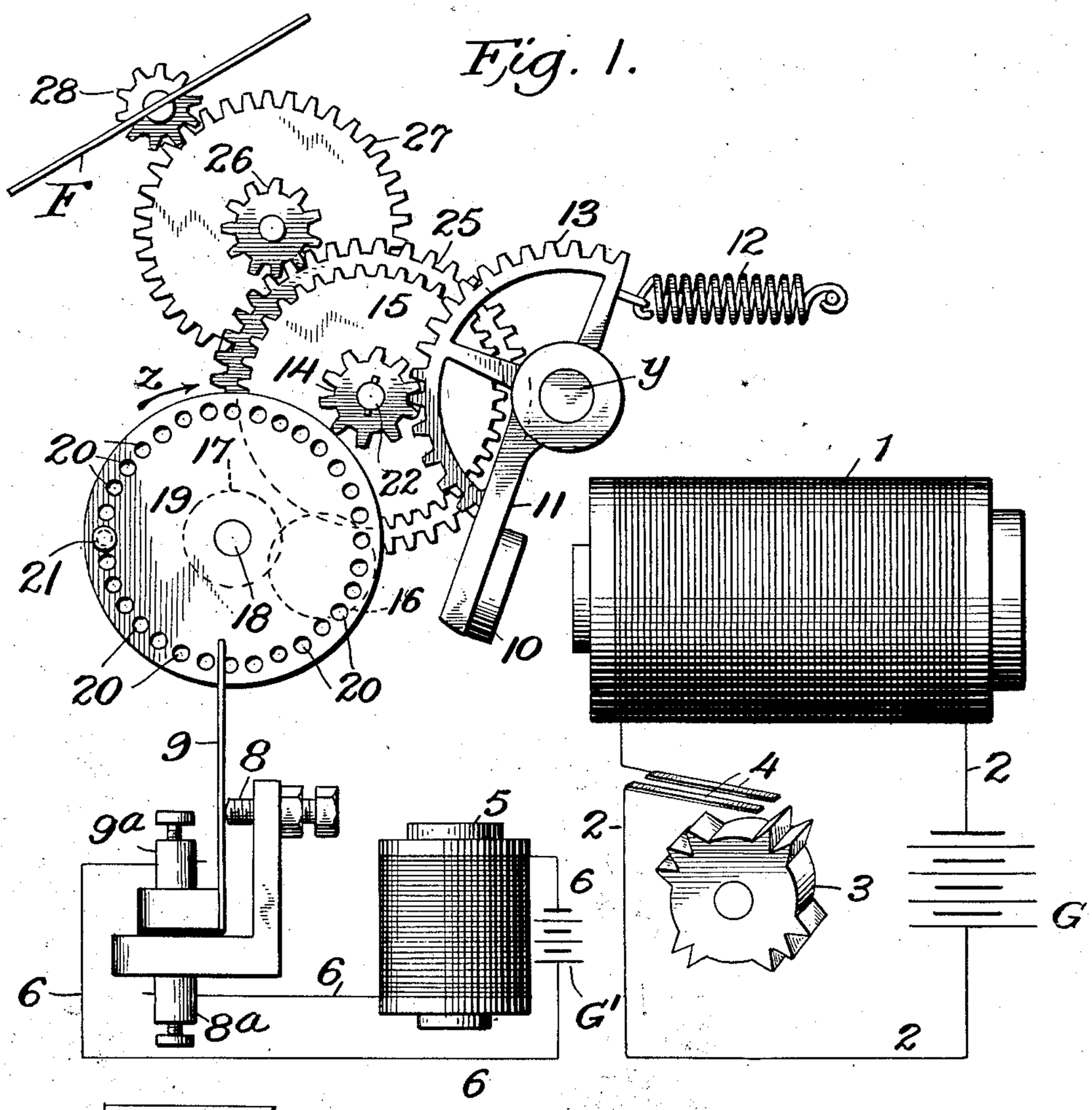


Fig. 2.

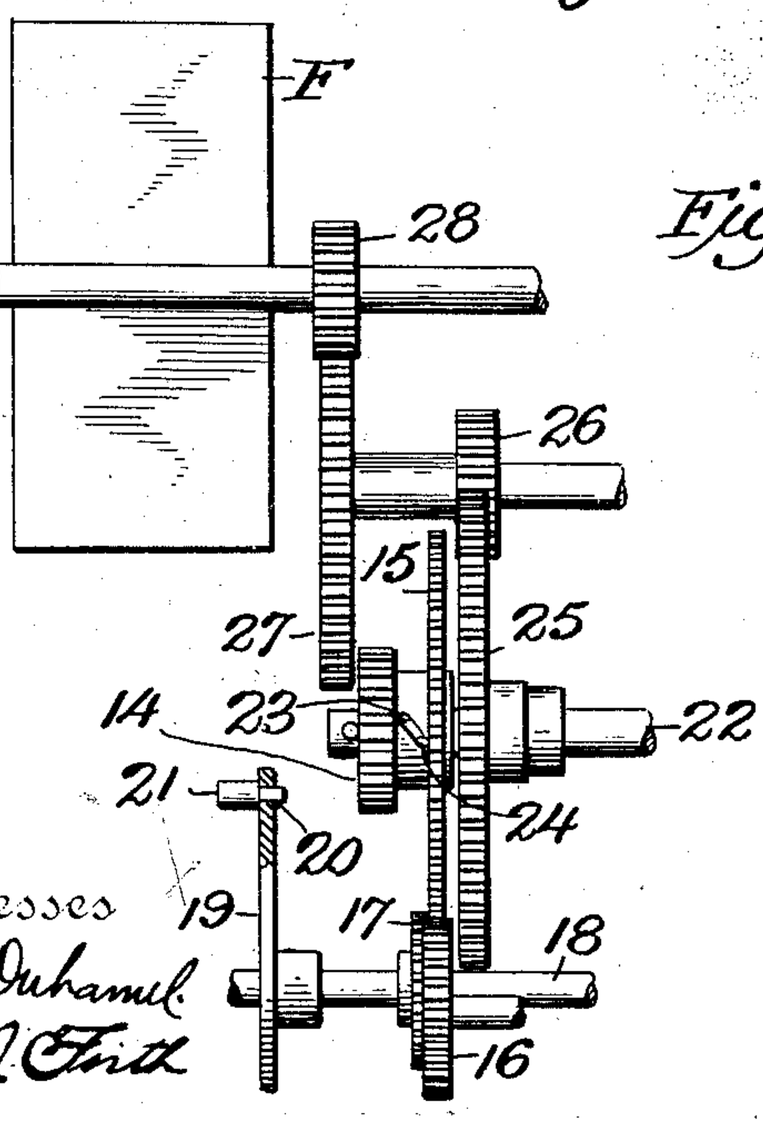
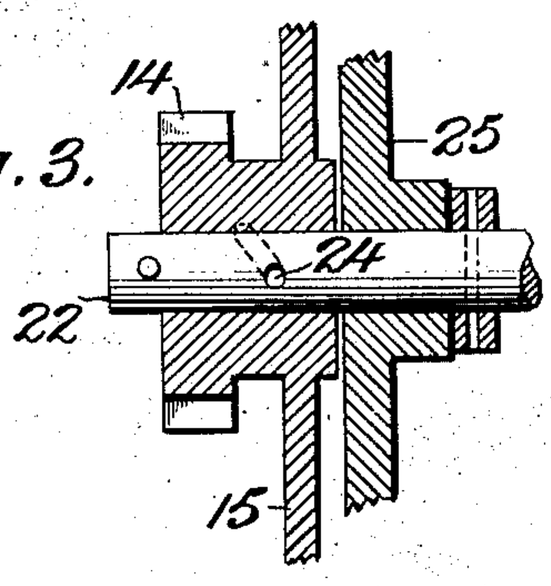


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

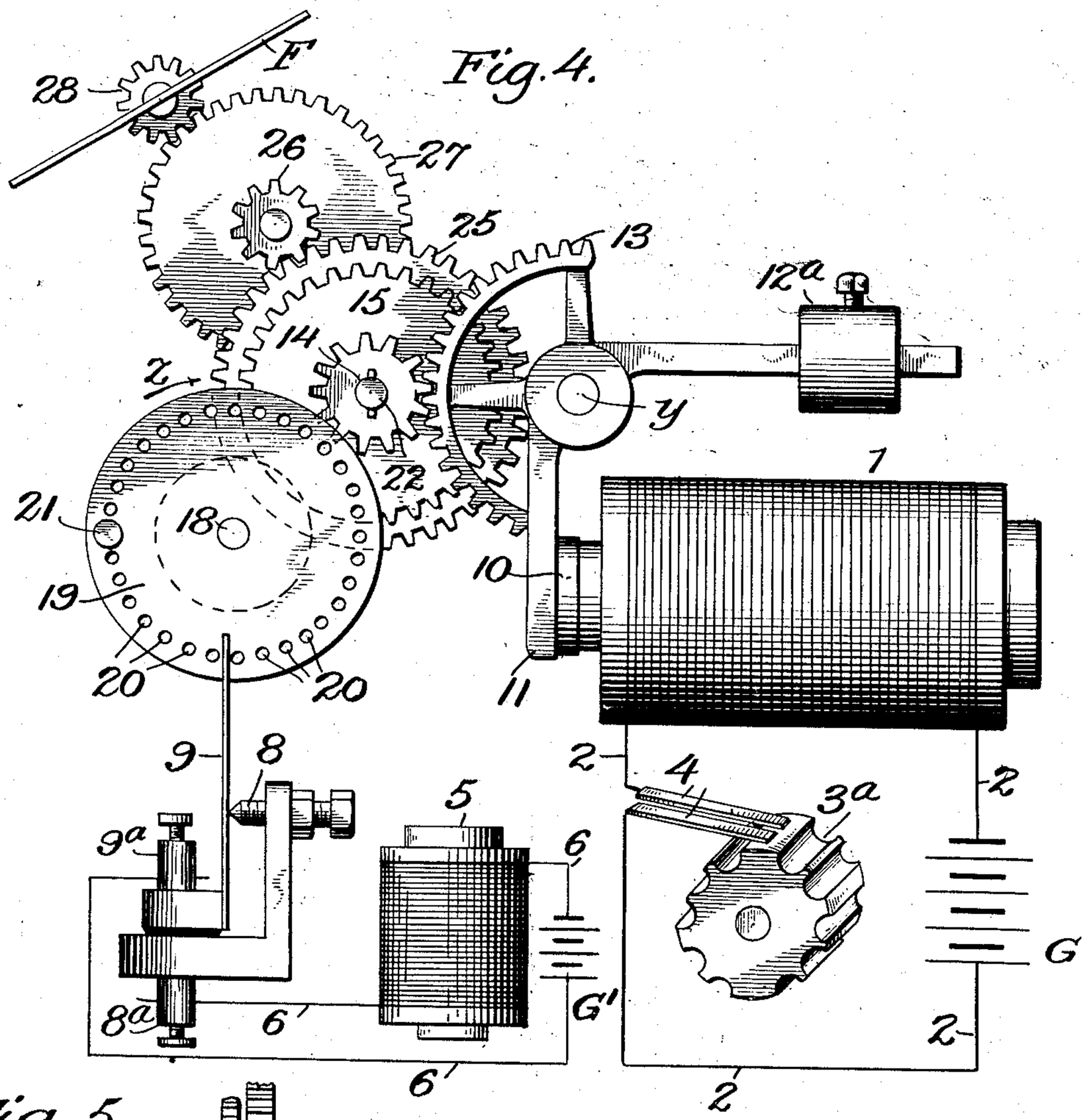


Fig. 5.

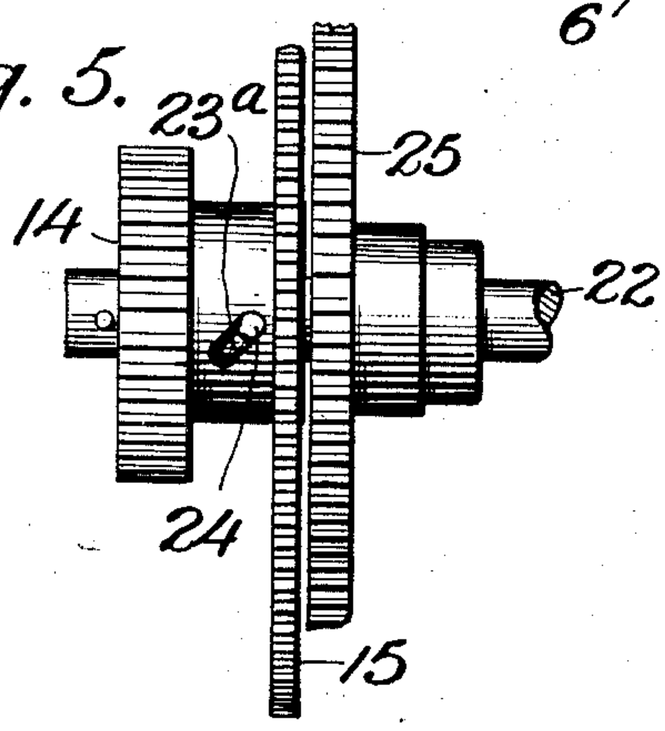
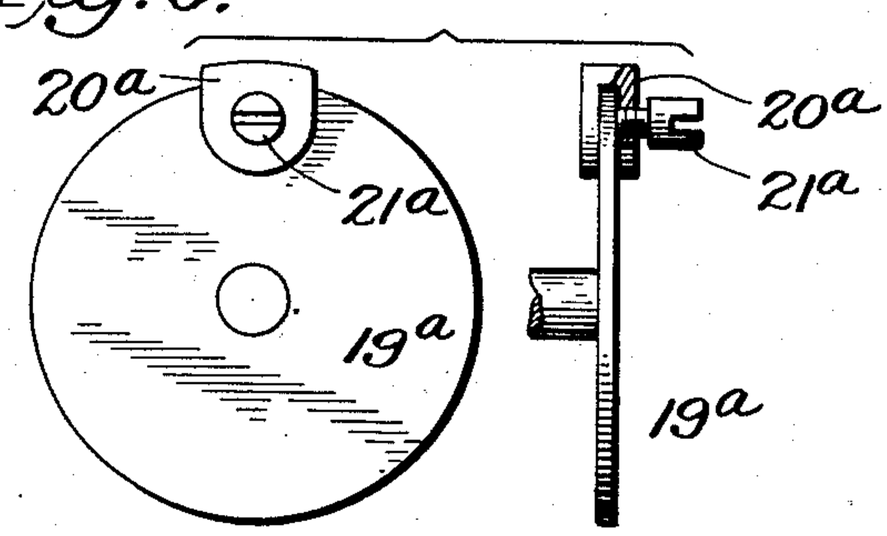


Fig. 6.



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UNITED STATES PATENT OFFICE.

PATRICK KENNEDY, OF NEW YORK, N. Y.

RETARDING DEVICE FOR ELECTROMAGNETS.

No. 821,504. Specification of Letters Patent. Patented May 22, 1906.

Application filed February 13, 1905. Renewed October 21, 1905. Serial No. 283,806.

To all whom it may concern:

Be it known that I, PATRICK KENNEDY, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, and city and State of New York, have invented certain new and useful Improvements in Retarding Devices for Electromagnets, of which the following is a specification.

This invention relates to means for retarding the armatures of electromagnets such as are employed, for example, in non-interference signaling devices for electric fire-alarm systems; and the object is to provide the retarding device with regulable automatic means for actuating a make-and-break device in an electric current when the armature of the main electromagnet reaches a predetermined point in its retarded movement toward or from the pole of its magnet.

In the accompanying drawings two forms of the invention are illustrated—one where the armature is retarded in its approach to the pole of the excited magnet, and the other where the armature is retarded in its movement away from the pole of its magnet.

Figures 1 to 3 illustrate the first form, and Figs. 4 and 5 the second form. Fig. 1 is a side elevation of the device. Fig. 2 is a plan view of the retarding mechanism only, and Fig. 3 is an enlarged sectional view illustrating the clutch device. Fig. 4 is a view similar to Fig. 1, illustrating the second form of the invention; and Fig. 5 is a plan view of the clutch device on a larger scale. Fig. 6 illustrates a modified form of the circuit-breaking detent device.

Referring primarily to the first three figures of the drawings, which show the device adapted to a signaling apparatus or instrument where the circuit is normally open, it may be explained that only so much of such signaling apparatus is shown as is convenient for explaining the operation of the present invention. In this case when the circuit is closed through the main magnet of the instrument the armature of the magnet is attracted, but moves slowly toward the pole thereof, being retarded in its movement, and that when it reaches a predetermined point in its travel a regulable detent device actuated by the armature operates a make-and-break device to break a circuit through another or auxiliary magnet, which may be in a separate circuit or a shunt, as the case may be. In these figures, 1 designates the main electromagnet; 2, its circuit, which includes a generator G; 3, a break-contact wheel such as is commonly employed in such signaling devices; and 4 the contact-brushes, through which the teeth on said wheel complete the circuit 2 through the magnet 1 at intervals as the wheel 3 rotates.

5 is an auxiliary electromagnet, 6 its circuit, and G′ a generator in the circuit. In this circuit is a make-and-break device having an adjustable contact 8, connected in the circuit through a binding-post 8^a, and a spring-contact 9, connected in the circuit through a binding-post 9^a.

The purpose is to cause the armature 10 of the main magnet 1 at a predetermined point in its retarded approach to the pole of its magnet to break the circuit 6 by moving the spring-contact 9 away from the stationary contact 8. The means for effecting this will now be described.

The armature-lever 11, carrying the armature 10, is fulcrumed at *y* and has a retracting-spring 12. On this lever is secured a curved racket 13, which gears with a pinion 14, and this pinion carries a spur-wheel 15, which gears through an intermediate pinion 16 with a pinion 17, fixed on the arbor 18 of a detent-carrier 19. This carrier has in it a series of sockets 20, in any one of which may be set a detent-stud 21, so disposed that when the carrier 19 is rotated in the direction of the arrow *z* the stud 21 will impinge upon the spring-contact 9 and move it away from the contact 8, and thus break the circuit through the magnet 5. In effecting this rotation of the carrier 19 the armature is retarded in its movement by means now to be described. The pinion 14 is mounted loosely on an arbor 22 and has an oblique slot 23, Figs 2 and 3, in its boss in which plays a stud 24, set in the arbor. Adjacent to the boss of the pinion is the main wheel 25 of the retarding-train, and this wheel is loose on the arbor 22. When the armature 10 is drawn toward the magnet, the first slight rotative movement of the pinion 14 about its arbor causes the slot 23 to so act on the stud 24 as to put the boss of the pinion into frictional driving contact with the wheel 25, and the train is thus driven. This train consists of the wheels 25, 26, and 27 and the fly 28. When the circuit through the magnet 1 is broken and the spring retracts the armature, the first slight rotative movement of the pinion 14 in the other direction moves it laterally out of contact with the wheel 25 by reason of the pin

and oblique slot, and thus frees it from the retarding-train, so that it will not be retarded thereby when retracted. The carrier 19 will, however, be returned by this movement to its original position, as the pinion is fixed to the wheel 15.

In the construction of Figs. 4 and 5 the same reference characters are used to designate parts that are alike in both forms of the invention. In this second form of the invention the circuit 2 is normally closed and is broken at intervals by the break-contact wheel 3ª. The retardation is effected on the retraction of the armature by a weight 12ª, which is the equivalent of the spring 12. (Shown in Fig. 1.) It will be noted by reference to Fig. 5 that the obliquity of the slot 23ª is opposite to that seen, for example, in Fig. 2, as it must be in order to effect the clutching when the armature is retracted. The intermediate pinion 16 is omitted in this second construction, as the operative rotative movement of the pinion is the reverse of that shown in Fig. 1.

Otherwise than as above indicated the construction is the same as that before described. In this construction when the circuit is broken through the principal magnet 1 the armature 10 will be slowly retracted by the weight 12ª, the clutch device acting in this movement to connect the pinion 14 with the retarding-train. At a predetermined point in the retractive movement of the armature the stud 21 in the carrier-disk 19 will act to break the circuit 6 through the auxiliary magnet.

The purpose of the carrier-disk 19 with the sockets to receive the stud 21 is to enable the stud to be adjusted and set so as to open the circuit 6 at any point desired in the travel of the armature 10. Obviously the sockets 20 constitute only one of many devices for effecting the object sought. Any equivalent means may be employed for effecting the adjustment of the circuit-breaking detent, so that it will be brought into operative position at any point in the movement of the armature. For example, Fig. 6 includes two views of a modified form of this detent device. In these views the carrier-disk 19ª is plain or without sockets and the stud 21ª is a set-screw which serves to secure a clip 20ª to the rim of the disk at any point desired.

Having thus described my invention, I claim—

1. A device for the purpose specified, having an electromagnet, its armature, armature-lever, and means for retracting the armature, an electric circuit, a make-and-break device in said circuit, a retarding device for the armature, and regulable, automatic means for actuating said make-and-break device, said means comprising a rotating carrier provided with an adjustable detent which acts on said make-and-break device, and mechanism between the armature-lever and said rotating carrier through which the former actuates the latter.

2. A device for the purpose specified, having an electromagnet, its armature, armature-lever, and means for retracting the armature, an electric circuit, a make-and-break device in said circuit, a retarding device for the armature, and regulable, automatic means for actuating said make-and-break device, said means comprising a rotating carrier provided with a plurality of sockets, a detent-stud to fix in said sockets, said stud being adapted to actuate said make-and-break device, and gearing between the armature-lever and said carrier through which the former rotates the latter.

3. A device for the purpose specified, having an electromagnet, its armature, armature-lever, and means for retracting the armature, an electric circuit, a make-and-break device in said circuit, a retarding device for the armature, and regulable, automatic means for actuating said make-and-break device, said means comprising a rotating carrier provided with an adjustable detent which acts on said make-and-break device, and mechanism between the armature-lever and said carrier which rotates the latter operatively when the magnet attracts its armature.

4. A device for the purpose specified, having an electromagnet, its armature, armature-lever, and retracting means, a retarding-train, the main wheel of which is loose on its arbor, the said arbor, another wheel adjacent to the former, loose on said arbor and having a boss with an oblique slot therein, a stud set in the arbor and engaging said slot, and a curved rack carried by the armature-lever and gearing with last-named wheel, said slot and pin serving to force the two wheels into frictional driving relations.

In witness whereof I have hereunto signed my name, this 10th day of February, 1905, in the presence of two subscribing witnesses.

PATRICK KENNEDY.

Witnesses:
JOHN REED,
J. L. WATSON.