No. 706,577. Patented Aug. 12, 1902.

F. MACKINTOSH.

ELECTRIC SWITCH FOR FLASHING LIGHTHOUSE LANTERNS.

(Application filed Jan. 9, 1899.)

(No Model.)

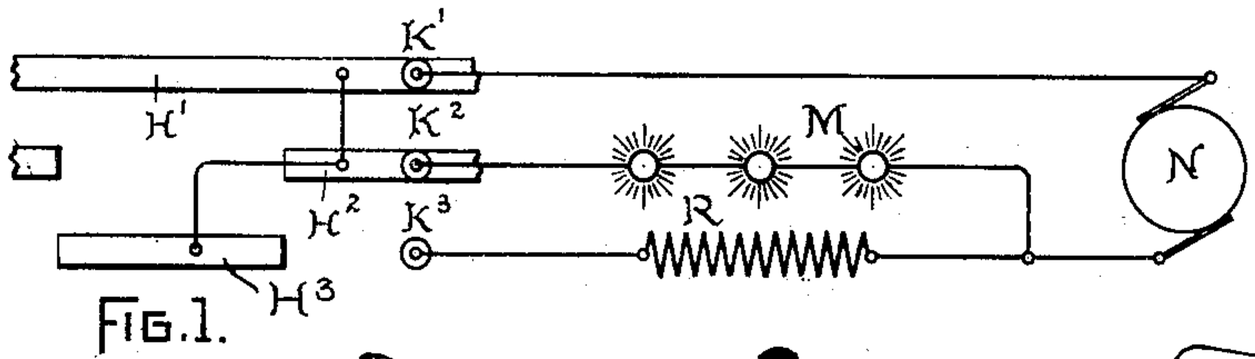

FIG. 1.

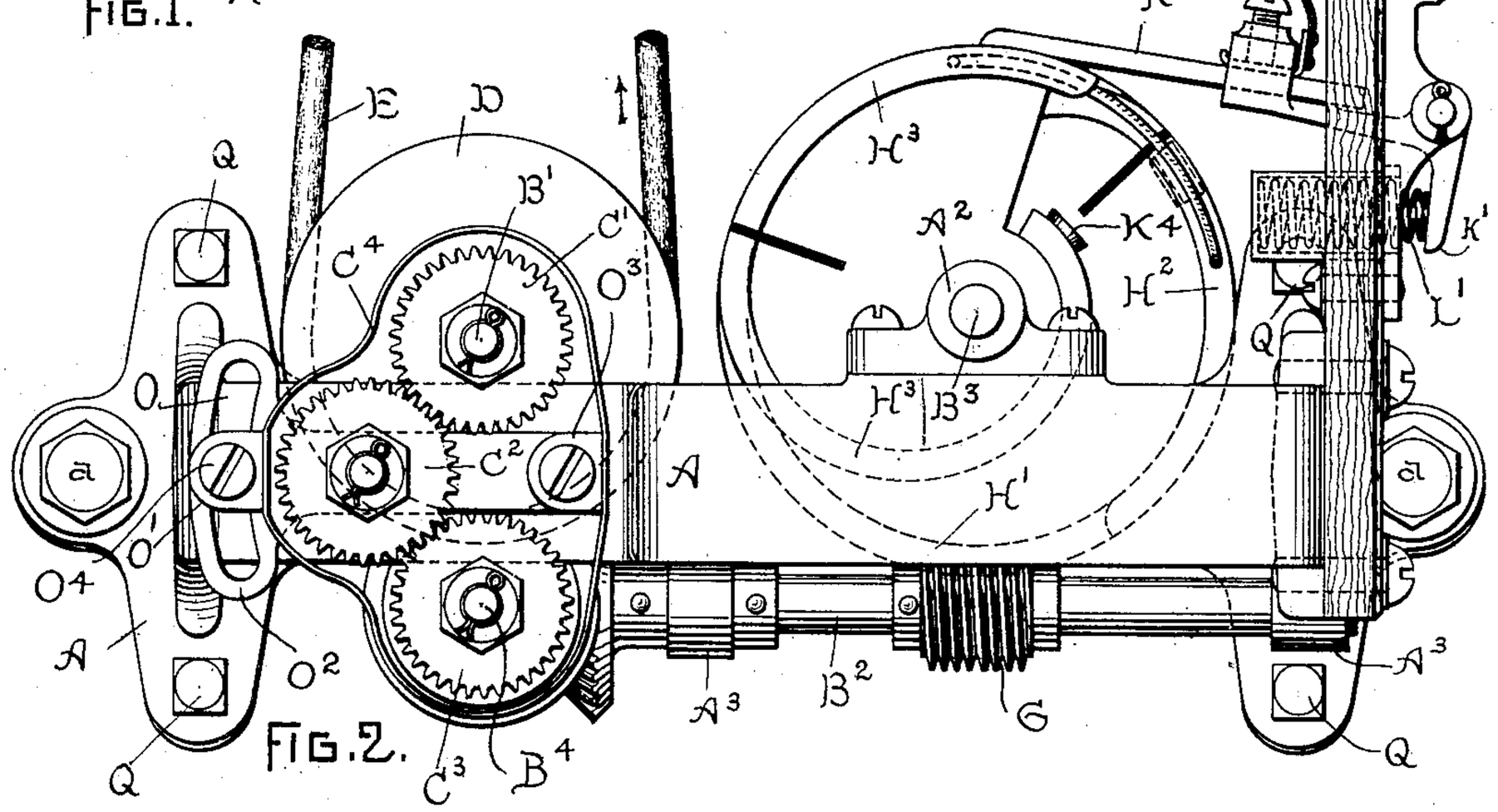

FIG. 2.

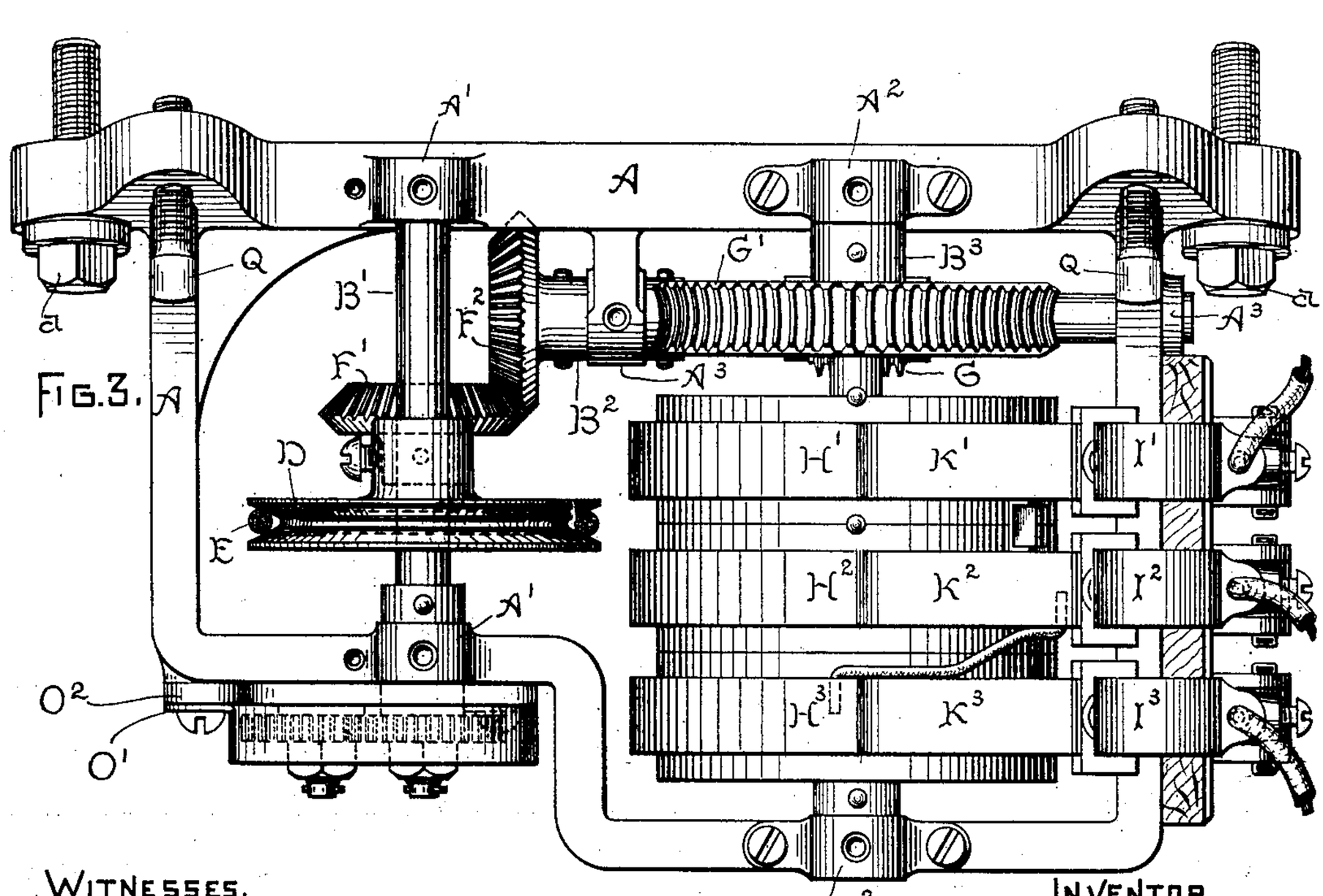

FIG. 3.

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UNITED STATES PATENT OFFICE.

FREDERICK MACKINTOSH, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC SWITCH FOR FLASHING LIGHTHOUSE-LANTERNS.

SPECIFICATION forming part of Letters Patent No. 706,577, dated August 12, 1902.

Application filed January 9, 1899. Serial No. 701,576. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK MACKINTOSH, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Switches for Flashing Lighthouse-Lanterns, (Case No. 831,) of which the following is a specification.

My present invention relates to devices for causing electric lights to "flash" or burn intermittently at regularly-recurring intervals. It is intended for and is particularly useful in lighthouses, but may be employed wherever necessary or desirable.

The main object of the invention is to provide a substantial and simple mechanism making the circuit changes in the order and with the speed chosen with regularity and without liability to derangement and keeping substantially a constant load upon the generator.

It is well known that sudden changes of the load on a generator are apt to produce violent sparking. The load in lighthouse illumination is generally small, the larger part of whatever current is generated being consumed in the lantern. The capacity of the generator therefore is usually only moderate. Under these conditions the percentage variation when the circuit is opened to extinguish the light is very large, ranging practically from zero to full load, and vice versa, at each circuit change. To avoid this difficulty, I provide an artificial load arranged to take a current substantially equal to that of the lantern and a switch for making the proper circuit changes. The contacts of the switch are arranged with an overlap in order to insure that one circuit is closed before the other is opened. The artificial load which I find most convenient is an ordinary non-inductive resistance; but obviously any translating or current-consuming device may be used.

To accomplish the objects here briefly indicated, I provide an improved switch having continuous rotary movement, with connections and fixed contacts such that the circuit changes desired are made in proper order. The switch is driven by any convenient motor at the speed chosen either through gearing or otherwise. In practice I have arranged the device to be bolted to the dynamo and belted to or otherwise driven by the dynamo-engine, thus locating all the moving electric apparatus together, where it may be conveniently inspected and kept in proper working order. In general the switch consists of a ring making constant contact by the usual brush with the lead from one terminal of the generator and one or more other contact-rings, partly cut away, with which other brushes register to complete in proper sequence the circuits to the other generator-terminal.

The arrangement will be better understood from the accompanying drawings, which show an embodiment of my invention, Figure 1 being a diagram of the circuits, Fig. 2 being a side elevation, and Fig. 3 a plan of the switch mechanism.

I will first describe Figs. 2 and 3. In these figures, A is the frame of the device, which may be secured to any suitable support by the bolts *a a*. The angle at which the frame shall stand is determined by the position of the set-screws Q Q, which allow the device to be applied to the sloping end of a dynamo-frame. In the frame A are journaled four shafts B' B^2 B^3 B^4 in suitable bearings A', &c. The shaft B' carries a pulley D, driven at any suitable speed and in proper direction by the belt E. The pulley is geared to the shaft B^4 through the gears C' C^2 C^3. These gears are inclosed in a suitable casing C^4, and it is manifest that by changing the gear relation the speed of the switch may be changed without changing that of the driving power. The gear C^2 is carried by an arm O', pivoted at O^3. This arm is extended and slotted at O. A screw O^4, carried by an extension O' from the gear-case C^4 and by the frame A, serves to lock the arm O^2 in any desired position and permits the gear C^2 to be shifted to accommodate itself to any change in the relative diameter of the gears C' C^3. This permits the speed of the shaft B^4 to be adjusted at will. Upon the shaft B^4 is a bevel-wheel F', meshing with a similar wheel F^2 on the shaft B^2. A worm G on the latter shaft drives the worm-wheel G' on the shaft B^3, turning that shaft and with it the moving parts of the switch. The latter consists of three moving contacts, one of which, H', is a complete cir-

cle or collector-ring, and with it constant contact is made. The other two are snail-cams H^2 H^3. With these the brushes K′ K^2 K^3 register, and as the latter make and break contact the lights are kindled and extinguished. K^4 is a rubber stop. This or a similar form of cam contact is desirable because it permits the brushes to snap in breaking contact, yet the circuit is completed with an easy action, giving a gradually-increasing pressure until the contact is quite firm. The arrangement of the contacts is such that one of the brushes K^2 K^3 is always engaged before the other breaks contact. The brushes K′, &c., are forced against the cams by the springs I′ I^2 I^3, which also act as current-carriers, the main pressure, however, being supplied by the springs L′, &c., acting upon the bell-crank levers *k*′, &c. The three rotating contacts are cross-connected, the circuit being as shown in Fig. 1. Here N is the generator; M, the lamp or lamps. R is the resistance, substantially equivalent to the effective resistance of the load or lights M, being substituted for it by the revolution of the switch, so that the generator never works on open circuit. The arrangement of the switch is such that the circuit is never broken at the lights until the resistance is substituted, and vice versa. The circuit is from the plus-brush of the generator to the brush K′, then to the ring H′, to the contact H^2 or H^3, as the case might be, then back to the generator through the lamps M or the resistance R or momentarily through both. The adjustment should be such that the two circuits are in multiple for a short time only; otherwise the load on the generator will be subject to the variation which it is the object of the invention to avoid. In a particular apparatus built by me I have found that the ammeter shows twenty-four amperes when the lantern is lighted and twenty-four amperes when the resistance alone is in circuit and rises to thirty amperes during the instant of change. This does not cause objectionable action in the generator.

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

1. A switch comprising a plurality of relatively rotary contacts, a drive-shaft, a gear-train connecting the same with the rotary switch element, and an adjustable journal for one of the gear-wheels to permit changeable gearing to vary the rate of change in the control-circuit.

2. A switch comprising a rotary contact, a spring-brush bearing thereon, an offset at the end of the contact to permit the brush to snap out of engagement, and a cushion of yielding material on the rotary contact to arrest the snapping movement of the brush.

In testimony whereof I have hereunto set my hand this 5th day of January, 1899.

FREDERICK MACKINTOSH.

Witnesses:

B. B. HULL,

M. H. EMERSON.