N. S. KEITH.

Regulator for Electric-Lamp.

No. 227,264. Patented May 4, 1880.

Fig. 1.

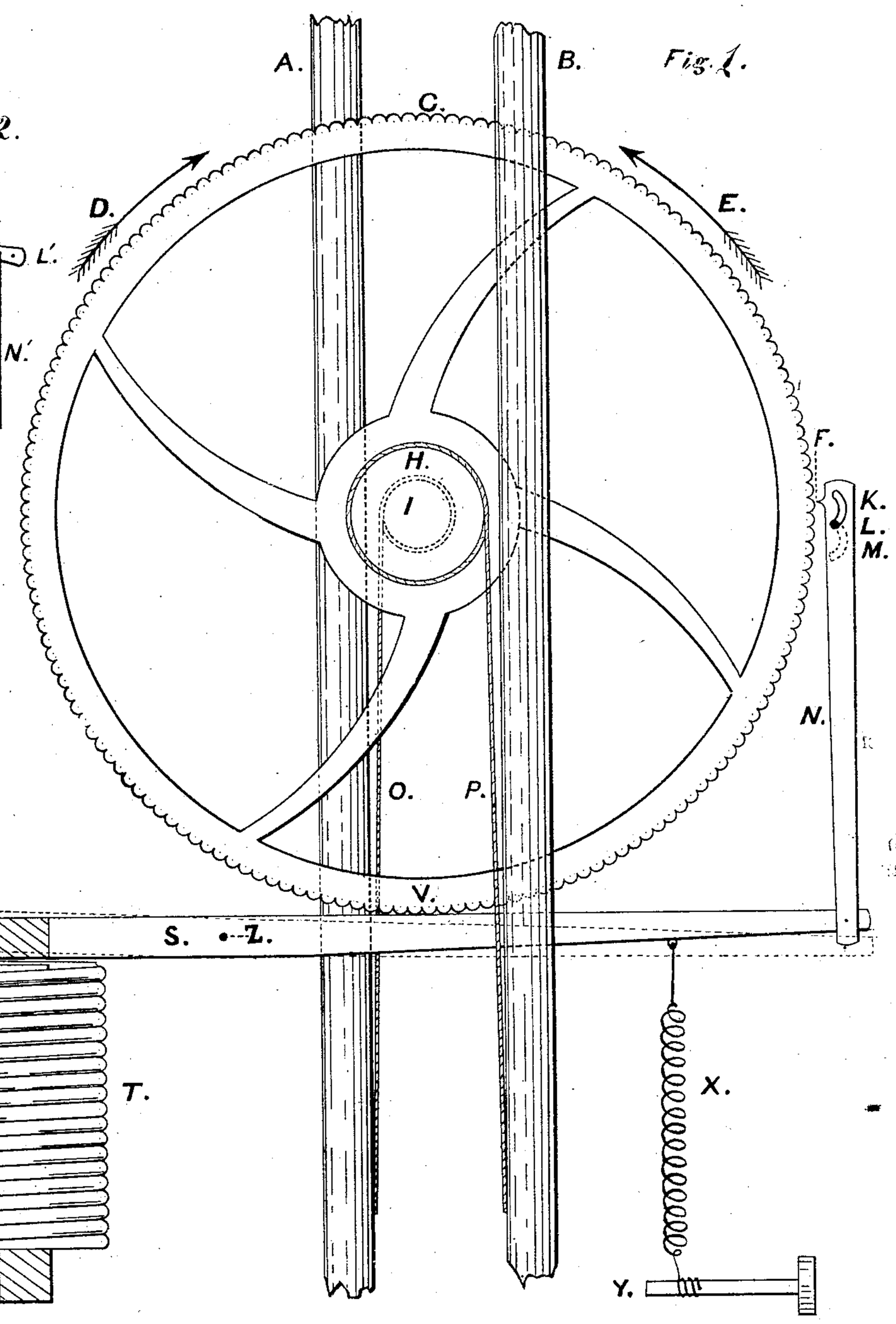
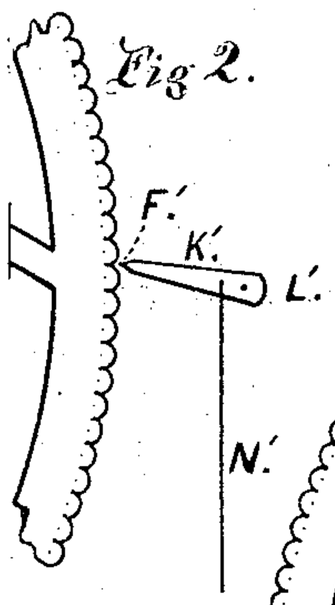


Fig 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

NATHANIEL S. KEITH, OF NEW YORK, N. Y.

REGULATOR FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 227,264, dated May 4, 1880.

Application filed April 22, 1879.

To all whom it may concern:

Be it known that I, NATHANIEL SHEPARD KEITH, of the city, county, and State of New York, have invented some new and useful Improvements in Lamps or Regulators of Electric Light; and I do hereby declare that the following is a full description of the said improvements, reference being had to the accompanying drawings, making part of this specification.

Heretofore the movements of the carbon pencils consumed in the production of electric light have been made by mechanisms actuated by weights or springs, and also by the weight of one of the rods to which one of the pencils was attached. The movements have been controlled in extent and time by various devices, chiefly depending upon changes in the strength of magnetism of electro-magnets for the efficiency of their action.

My invention is related to this class, and is devised for the purpose of simplifying and cheapening the mechanical construction of lamps or regulators, and at the same time for securing regularity of feed, and that at needful periods.

Referring to the accompanying drawings, I will proceed to describe my invention and its operation.

I provide a serrated wheel, C, the axis of which is at I. Upon one side I make an axial cylindrical extension or drum, H, of the hub, which drum is made twice the diameter of a similar drum-extension, I, upon the other side. Fastened upon the drums H and I are the cords or chains O and P, as shown. The other ends of the cords or chains are fastened to the upright rods A and B, which are free to move up or down in proper guides. The wheel and drums are free to rotate on their common axis in either direction, but together. When moving in the direction of the arrow D the rod B moves downward and the rod A upward, and in the contrary direction when moving in the direction of the arrow E. The rod A carries the negative carbon pencil, and the rod B the positive carbon pencil, by aid of the proper extensions and clamps, as usual. The movement of B in either direction is twice the length of the corresponding movement of A. The rod B and its attachments must be of such a weight that it a little more than counterbalances the weight of the rod A and its attachments; so, when free to move, the rod B runs down and the rod A up. Before the light-arc is established, with the carbon pencils in place, touching one another, as is usual, the lever S has a position shown by the dotted lines, and the rod N is also depressed, so that the curved or eccentric slot K has the position shown by the dotted lines M. The lever, which acts somewhat like a pressure-brake, has its fulcrum at Z.

On closing the electric circuit the electro-magnet T draws down the iron end R of the lever S, thus raising the other end, as well as the rod N. This movement of the rod N, by reason of the curved slot K M operating on the fixed pin L, carries the point F, so that it engages the serrations of the wheel C, moves it and the drums H and I in the direction of the arrow E, and separates the points of the carbon pencils, thus establishing the light-arc. The curved slot K M is of such shape and adjustment that when the rod N has reached the limit of its upward movement the point F is free from the wheel C. The lever now presses against the wheel at V, and, acting as a brake, stops its motion in either direction. All parts of the lever and its attachments have then the position shown at R S N K. When, by decrease in the current of electricity from reason of the increase of the length and resistance of the light-arc, the strength of the magnetism of the electro-magnet decreases sufficiently to allow the end R of the lever to rise, the wheel moves in the direction of the arrow D until the movement has so decreased the length and resistance of the light-arc and increased the current of electricity, and consequently the strength of the electro-magnet, that the end R is again attracted strongly enough to cause sufficient pressure of the lever on the wheel to stop its motion. This movement continues, alternately freeing and stopping the wheel during the continuance of the light, but is never so great as to allow the point F to re-engage the wheel C. The pressure at V is regulated by the spring X and axle Y in obvious manner.

The requisite and proper insulations of the several parts are made in the construction of this apparatus.

The principles upon which this construction

is based depend upon the following facts: First, as the attractive power of magnetism is in inverse proportion to the square of the distance of the matter attracted, it follows that a force which will barely move the attracted matter away from the magnet is more than sufficient to keep it so removed in proportion to the square of the distance; second, if the force exerted in keeping matter away from the magnet be decreased the matter will again move to the magnet; third, the center of a line drawn from the apex of one serration to the next of a serrated wheel is nearer to the center of the wheel than the apices of the serrations are.

Now, in my improved regulator, the lever S, pressing as a brake against the serrated wheel C at V, and bearing on two apices, when the attraction of the electro-magnet weakens the force exerted through the wheel on the lever by reason of the weight of B so far overcomes the attraction that R rises and V falls, so that the wheel moves in the direction of the arrow D; but immediately on the passing of an apex the force exerted on the lever through the wheel becomes *nil*, by reason of the space between the serration just past and the next succeeding one, so that the attraction of the magnet at once draws the lever back in time to stop the movement of the wheel by reason of pressure of the lever on the next serration. Meantime, the carbon points having approached each other sufficiently, the current reaches its maximum. The operation just described is repeated as soon as necessary.

As the movement of the carbon pencils takes place under slight decrease of magnetism, and is very small, there are no practical variations in the light, and the current of electricity is automatically regulated.

I do not limit my invention to the form of serrations shown, as any form of teeth will answer, as also will a wheel polygonal in shape. Neither do I limit my invention to a single wheel, as a train of wheels may be used, with the lever pressing on one of them, which is serrated, as described. Neither do I limit myself to a plane surface on the lever or brake where it presses against the serrations, as at that place I have placed on the lever a pyramidal knob or tooth, and have also made the surface convex where greater movement of the lever was desirable; but I do not claim the use in this connection of a detent acting as a positive stop, after the manner of a pawl.

Figure 2 shows an arrangement for moving the wheel in the direction of the arrow E for the purpose of moving the carbon pencils apart in the process of establishing the light-arc, and which performs the same office as the curved slot K and fixed pin L, Fig. 1. This consists of the lever K′, which has its fulcrum at L′ and is moved by the rod N′, which has a like attachment to the pressure-lever S, Fig. 1. This arrangement I consider an equivalent to that shown in Fig. 1.

I claim—

1. In lamps or regulators for electric light, the combination of a serrated wheel, C, the lever S, and the electro-magnet T, when used for controlling the feed-movements of carbon pencils, substantially as described.

2. In lamps or regulators for electric light, the combination of a serrated wheel, C, the point F, the slot K, the pin L, and the bar N, when used for effecting the movement apart of carbon points or pencils, substantially as described.

3. In electric lights, the mode of controlling the feed-movements of carbon pencils, which consists in alternately freeing and stopping the motion of a serrated wheel by varied pressure of a lever-brake upon the serrations of the wheel, substantially as described.

4. In electric lights, the mode of controlling the movements of mechanisms of lamps or regulators, which consists in using magnetism for varying the pressure of a lever-brake upon the periphery of one of the serrated wheels of the mechanism, substantially as described.

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Witnesses:
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