

(No Model.)

2 Sheets—Sheet 1.

W. A. PHILLIPS.
ELECTRIC ARC LAMP.

No. 504,277.

Patented Aug. 29, 1893.

Fig. 1.

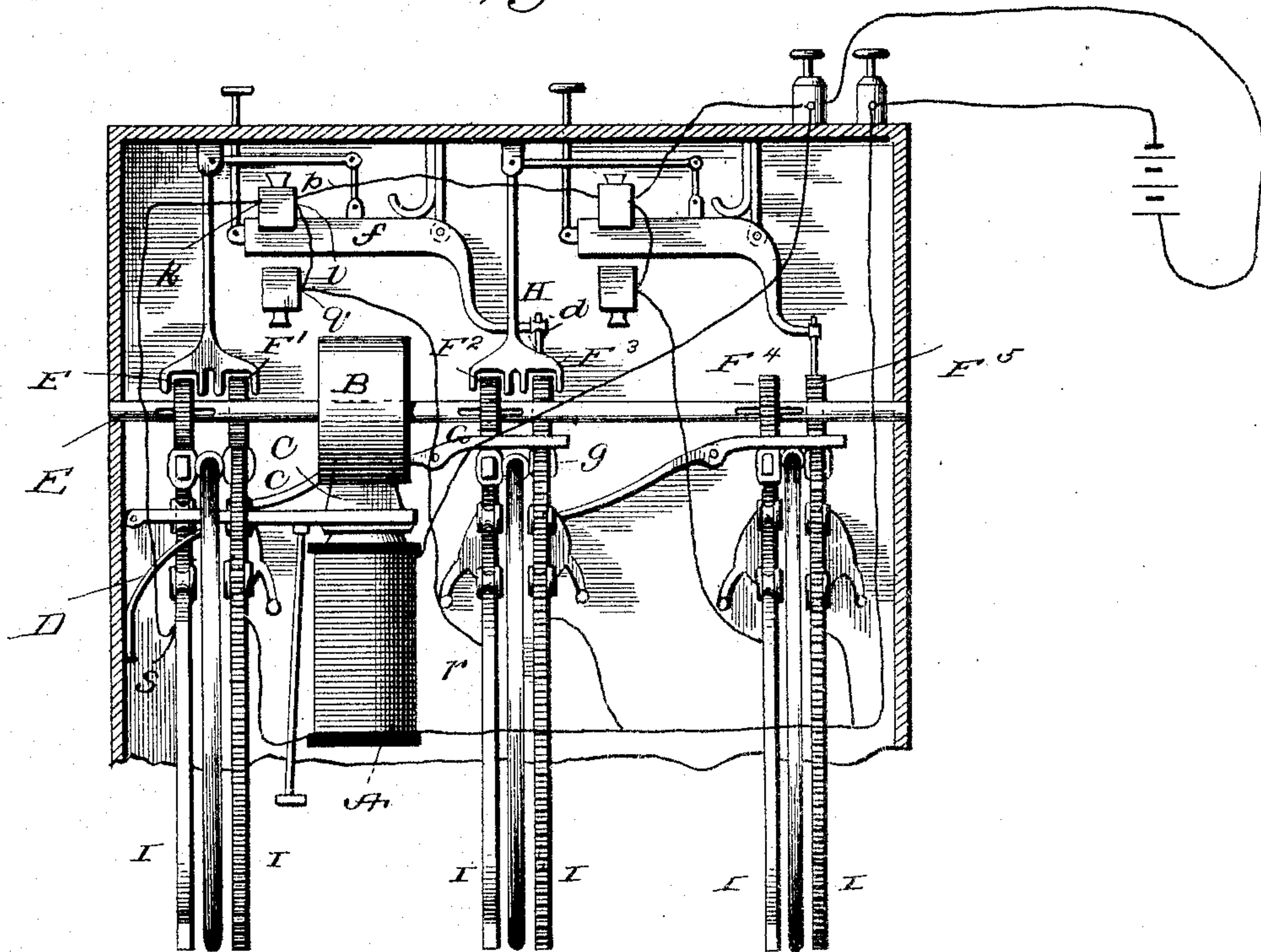
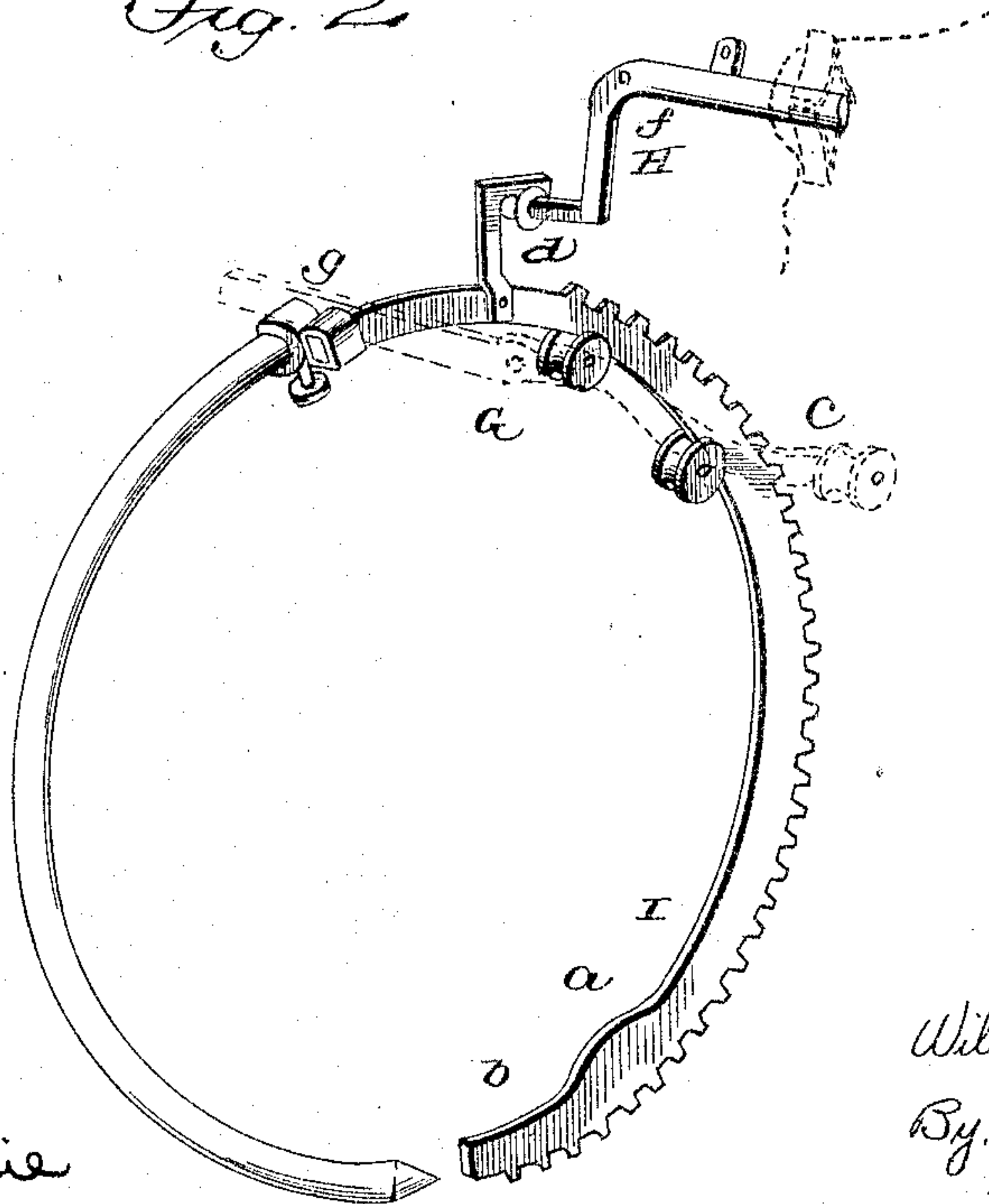


Fig. 2



Witnesses

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By *X. Deane*
his Attorney

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Fig. 3.

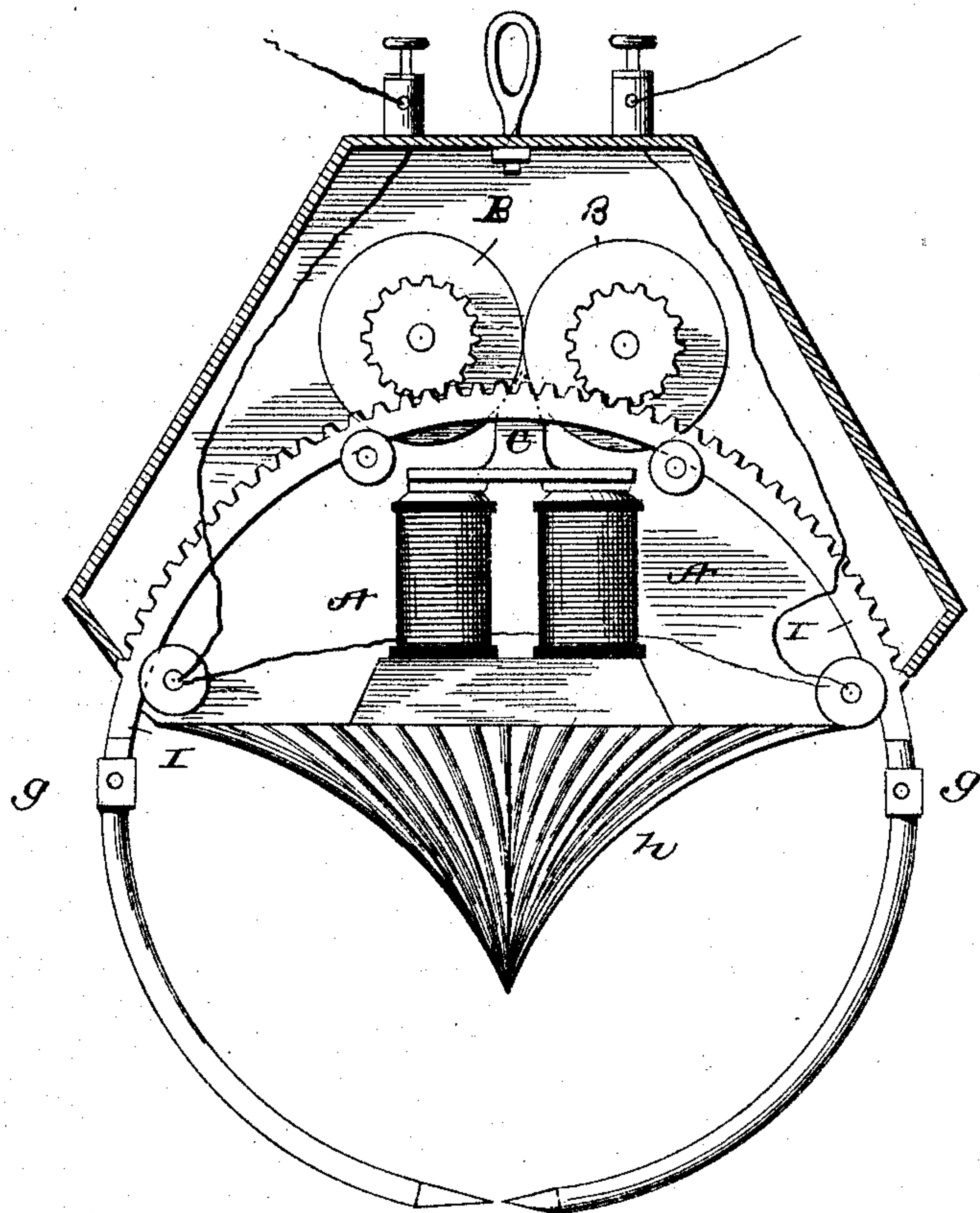
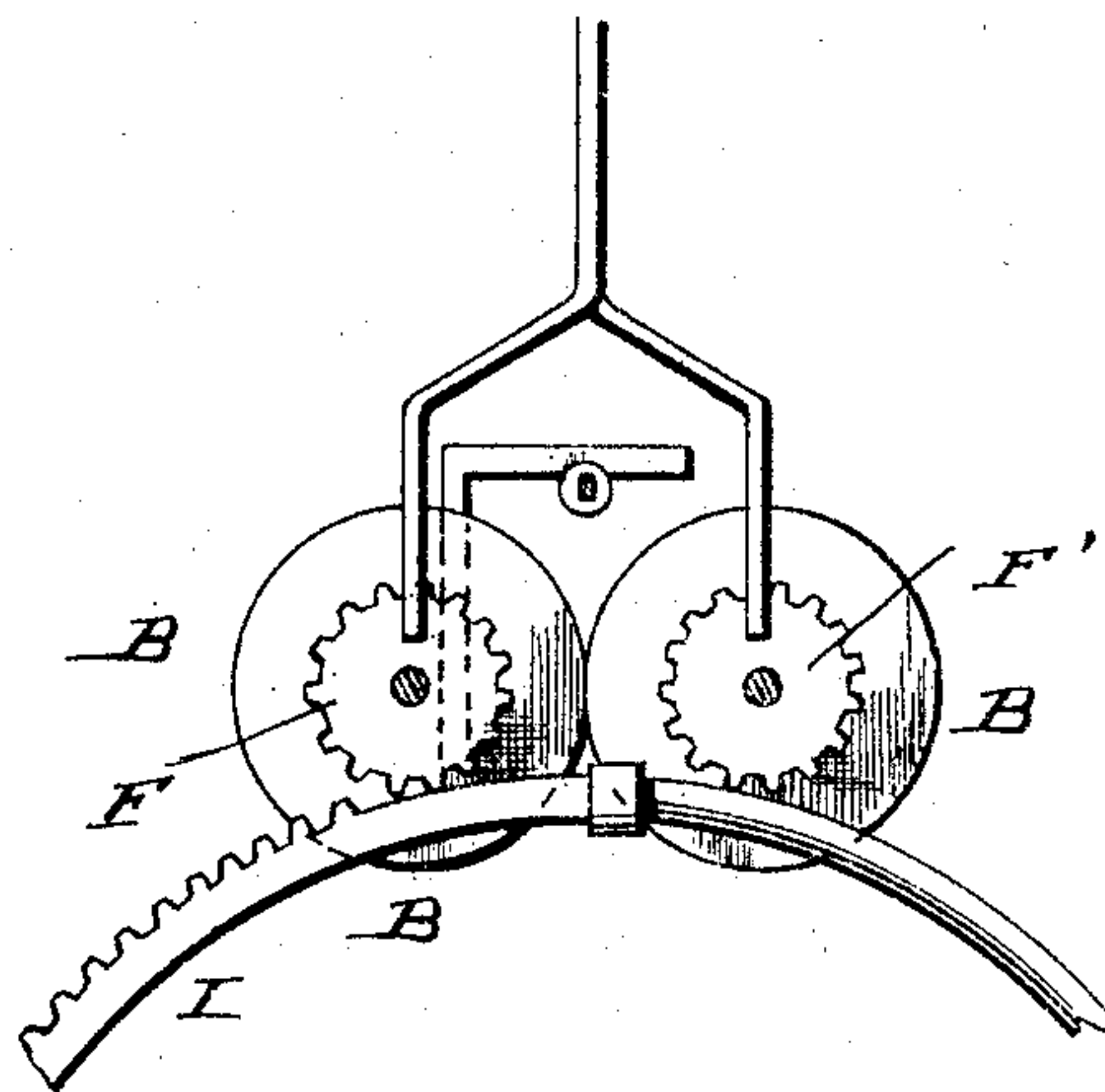


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM A. PHILLIPS, OF THE UNITED STATES ARMY, ASSIGNOR OF ONE-HALF TO THOMAS J. PORTER, OF MILES CITY, MONTANA.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 504,277, dated August 29, 1893.

Application filed June 3, 1893. Serial No. 476,443. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. PHILLIPS, second lieutenant, Twenty-second Infantry, United States Army, a citizen of the United States, residing at Fort Keogh, in the county of Custer and State of Montana, have invented certain new and useful Improvements in Magazine Arc Lamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved electric arc lamp specially designed for dispensing with the necessity of putting in a new carbon daily and all that is necessary is to load the lamp once in seven or eight days and it will burn for that length of time without being touched.

The lamp consists of a novel combination of parts, substantially as hereinafter fully disclosed, and pointed out in the claims.

My invention consists essentially of an electro-magnet operated by a shunt from the main current or taking the entire current when the arc is not formed. Said magnet has attached to it an armature which is held away from the magnet by a spring and held against two wheels as a wedge yet acting as a brake for the said wheels. The axle of the wheels has attached to it cog wheels which engage in a curved line of cogs to the ends of which are attached the carbons in pairs, one to the cogs from one side and one from the cogs of the other side. Curved carbons are used and they come together below the lamp mechanism thus causing the shadows of the lamp to be upward.

The method of operating the lamp is as follows: The wedge holds the carbons in any position not allowing them to touch as will be shown later but as soon as the current is turned, then the electromagnet draws down the armature and thus takes the wedge from between the wheels and allows the carbons to touch. This of course starts the current through the carbons and diminishes the current going through the magnets so much that the magnet lets the wedge go back between the wheels. As this is done the wedge turns the wheels slightly which pulls the carbons apart thus forming the arc. When the arc becomes so

long that the resistance becomes very great then the current goes through the magnet again and takes the wedge from between the wheels and thus allows the carbons to feed but does not let them touch. All the time a part of the current passes through the magnet but not enough to overcome the spring until the arc becomes very long and the resistance thus as great in the arc as it is in the magnet.

The above is the manner of operation of a single lamp but to have it arranged so that as soon as the carbons of one set burn out those of another set will come in it requires some extra mechanism. There is a bump on the curved cog interior which engages the end of a lever and disconnects the other end from holding the next set of carbons up so that the cogs do not engage in the next set of cog wheels. As soon as the next set of carbons are released they in turn release the end of a switch which cuts out the current from the first lamp and turns the current on to the second lamp. When these carbons have about burned out the next set are brought into action and the second set cut out, and so on for any number of sets of carbons. When the switch changes it also cuts out of gear the two cog wheels of the carbons being cut out. Thus the same electromagnet operates the entire lamp. If one set of carbons will not burn a second set can be brought into action by simply touching an arm which releases another set.

Figure 1, shows a side view of the magazine lamp with all of the connections and the arrangement for making the changes from one set of carbons to the next and so on until the last. Fig. 2, is a detail perspective view of the cog rim and carbon. Fig. 3, shows how my invention is used as a single arc lamp. Fig. 4, is a detail view.

A, is the electromagnets operated by the shunt from the main current.

B, is the brake wheel against which the wedge C, is held by the spring D.

E, E, are the axles on which the wheels F, F', F², F³, F⁴, F⁵, are placed and G is the arrangement for throwing the wheels F, &c., out of gear just as the current is switched off by the switch H, to the next set of carbons.

As the carbons are burned nearly up the projection *a*, on the under side of cog rims I, lowers the end of the arm *c*, thus disengaging the other end from the next set of cog rims.

5 In Fig. 2, the cog rim is shown. At the end *b*, is shown the projection *a*, lowering and thus raising *e*, so as to let the two cog rims drop. When they drop the arm *f*, disengages the end *d*, of the switch H, thus connecting
10 the current through *p*, *l*, *q*, and *r*, instead of through *k*, *s*. The next switch is operated in the same manner as the first and so on to the last one where the last set of carbons when they are burned out can in the same way as the
15 others shunt the current from the carbons to two conductors which can be made to drop together in the same way as the two carbons except inside the lamp.

Fig. 3, shows an end view of the lamp showing the electromagnets A, A, the wheels B, B, the wedge C, the armature the cog rim I, the carbon holders *g*, the cog wheels and the conical reflector *h*, with corrugations on it so as to prevent the shadows of the carbons. The
25 cog wheels may be insulated from the shaft on which they are placed. The carbon holders are insulated from the cog rims and the current conducted to the carbon holders through flexible cables. Each of the cog rims
30 is insulated from the rest of the lamp except where they receive the current through the wheels on which they roll around.

What I claim is—

1. In an electric arc lamp, the combination
35 of the circular carbon-holders and wheels intergeared therewith, an electro-magnet, and an armature adapted to engage said wheels as a brake and released therefrom by the action of said electro-magnet, substantially as
40 set forth.

2. In an electric arc lamp, the combination, with an electro-magnet and its armature, of circular cogged carbon holders and wheels geared therewith and acted upon by said
45 armature, said circular carbon-holders having their carbon-carrying ends approaching each other laterally from below, substantially as set forth.

3. In an electric arc lamp, the combination

of the cogged carbon-holders of circular form, 50 the wheels whose axes or shafts are geared to said carbon-holders, and an electro-magnet with its armature having a wedge engaging said wheels, to cause the aforesaid wheels to move said rack and to separate said carbon- 55 holders with their carbons or to cause them to approach, substantially as specified.

4. In an electric arc lamp, the combination of the circular racks carrying carbons, wheels whose shafts or axes are geared to said racks, 60 an electro-magnet and a spring-pressed armature adapted to turn said wheels, under the action of its spring, and to be moved away from the same by the action of said electro-magnet, substantially as specified. 65

5. In an electric arc lamp, the combination of the circular rack carbon-holders, wheels whose shafts or axes are geared to said rack carbon-holders, the spring-pressed armature having a wedge engaging said wheels and an 70 electro-magnet to retract said wedge from said wheels, to separate the carbons of said carbon-holders and to cause them to approach, respectively, substantially as set forth.

6. In an electric arc lamp, the combination 75 of sets or series of carbon-holders, wheels whose shafts or axes are geared to said carbon-holders, an electro-magnet, with a wedge-shaped armature adapted to engage said wheels, and a switch adapted to cut out of 80 the circuit the nearly used-up set of carbons and to bring into the circuit a fresh set of carbons, substantially as set forth.

7. In an electric arc lamp, the combination, with an electro-magnet and its armature of 85 the circular rack bar carbon-holders, wheels whose shafts or axes are geared to said carbon-holders and which are engaged by said armature, circuit closing levers adapted to engage a projection on each of said carbon- 90 holders, and a switch mechanism co-acting therewith, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM A. PHILLIPS.

Witnesses:

P. W. DAVISON,

H. G. HAMBRIGHT.