

(No Model.)

A. UTZINGER.  
ELECTRIC ARC LAMP.

No. 506,890.

Patented Oct. 17, 1893.

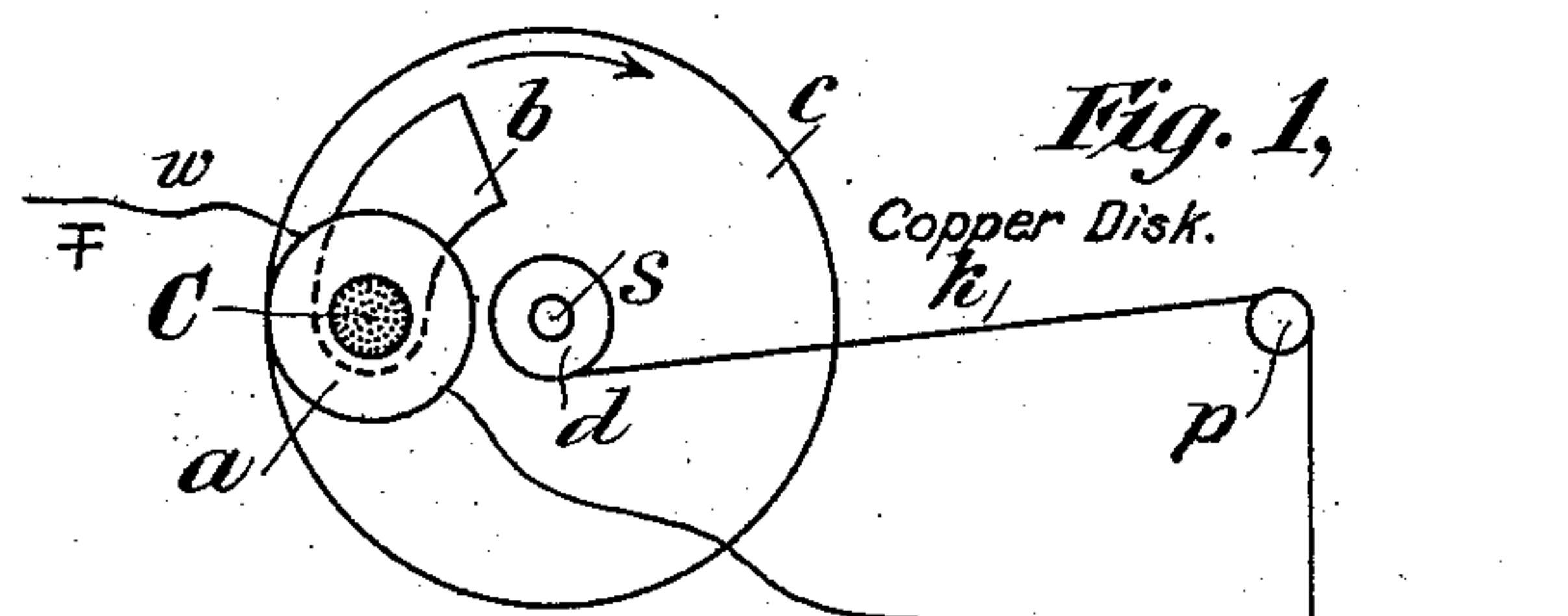


Fig. 1,

Copper Disk.

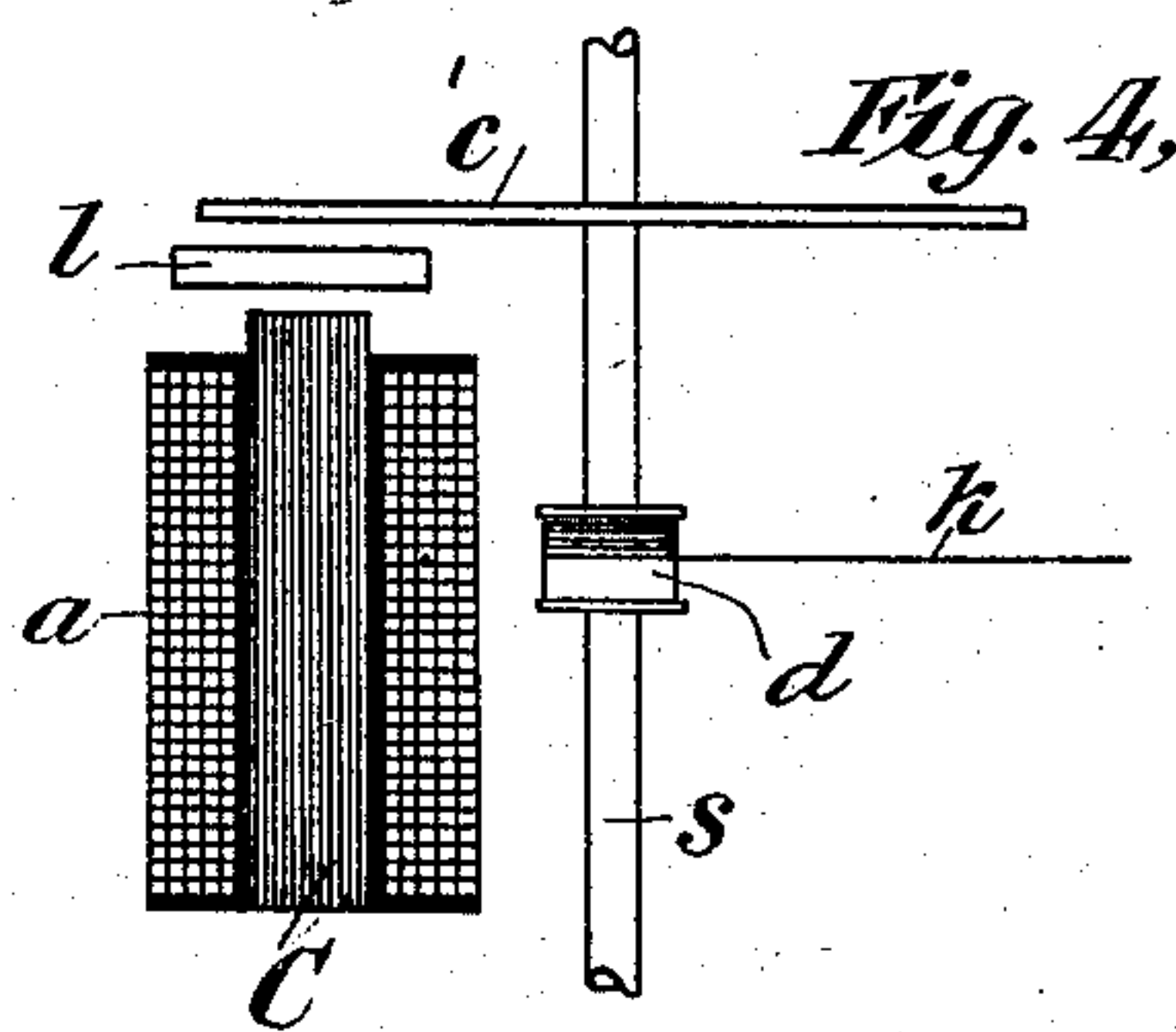


Fig. 4,

Fig. 2,

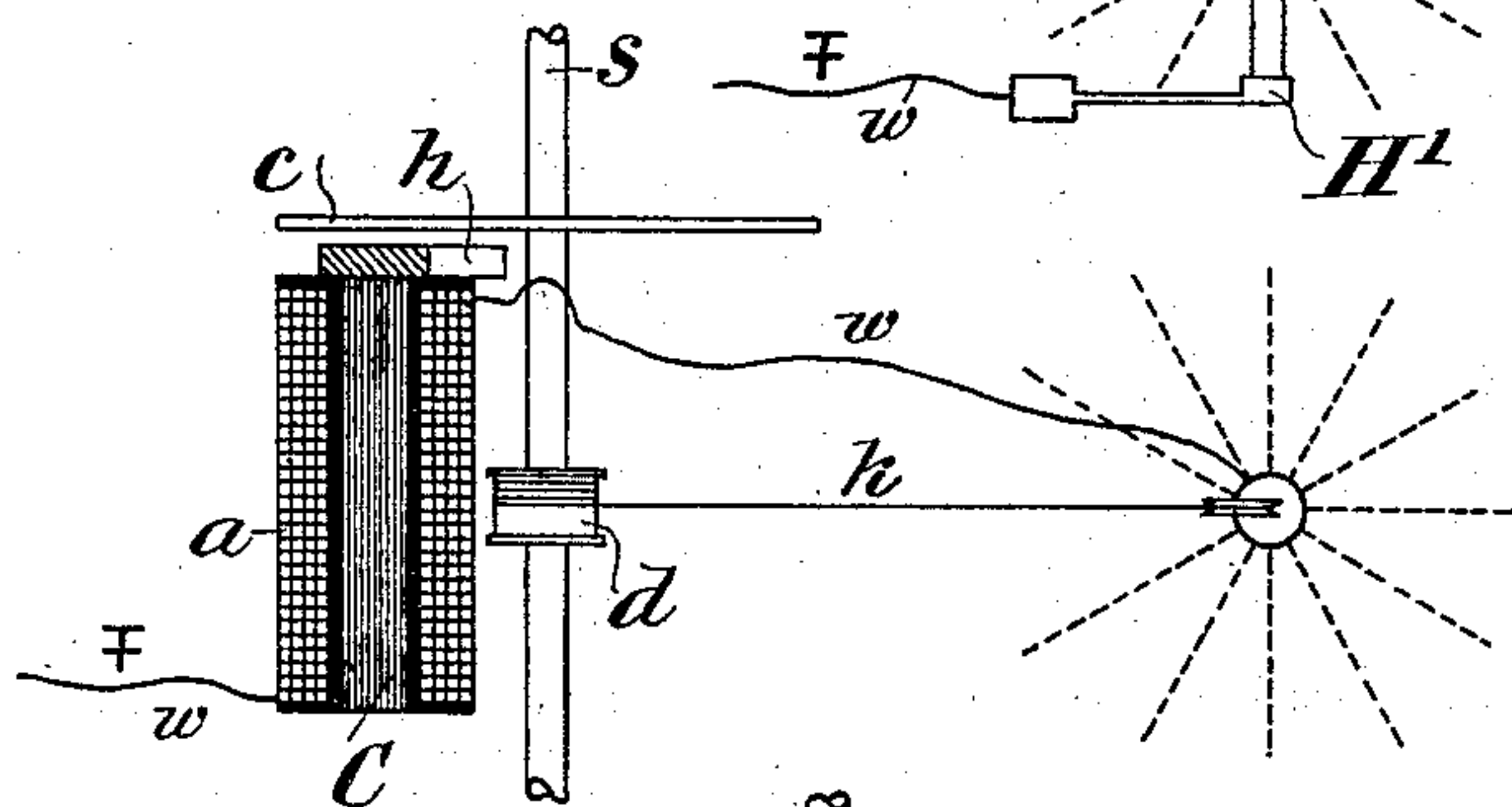


Fig. 3,

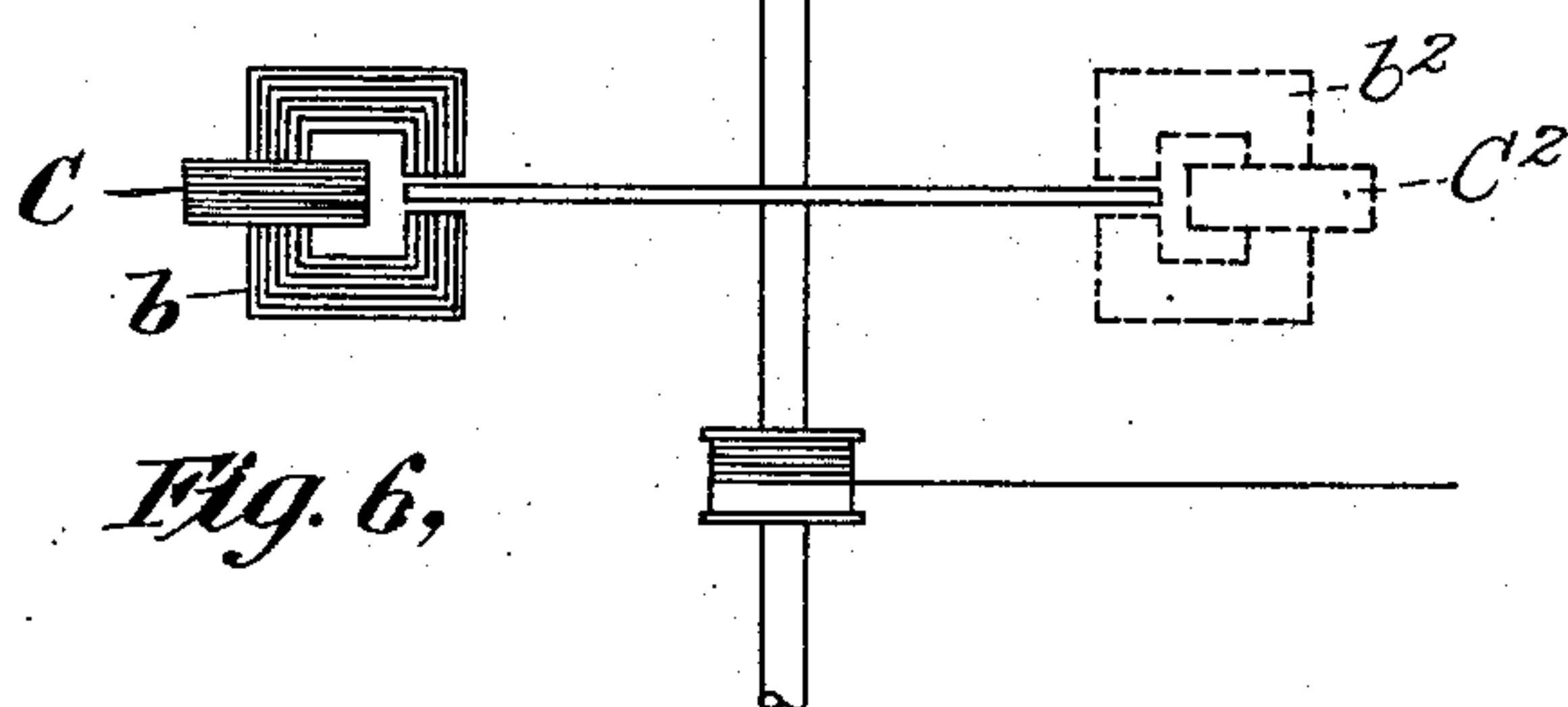
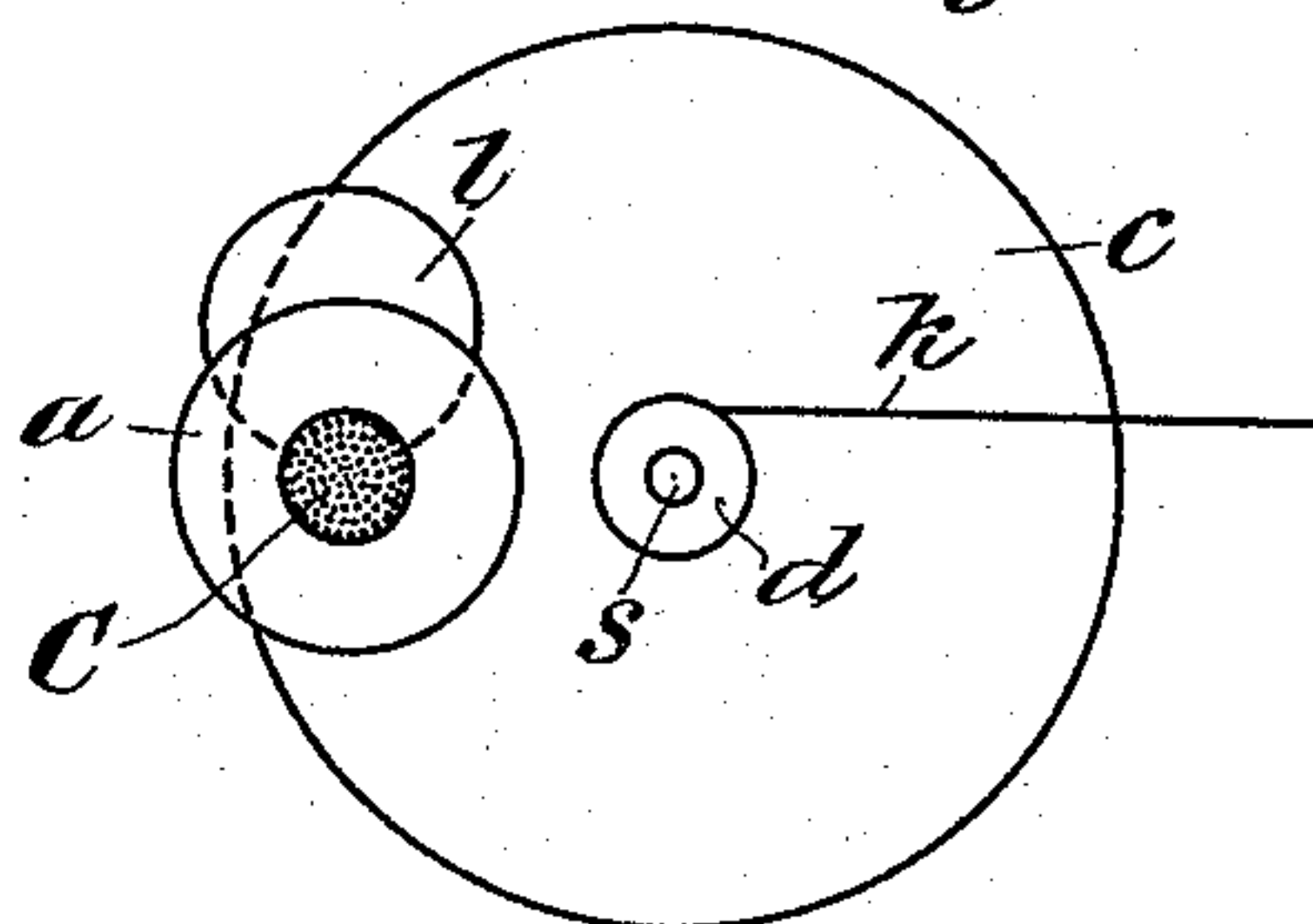


Fig. 6,

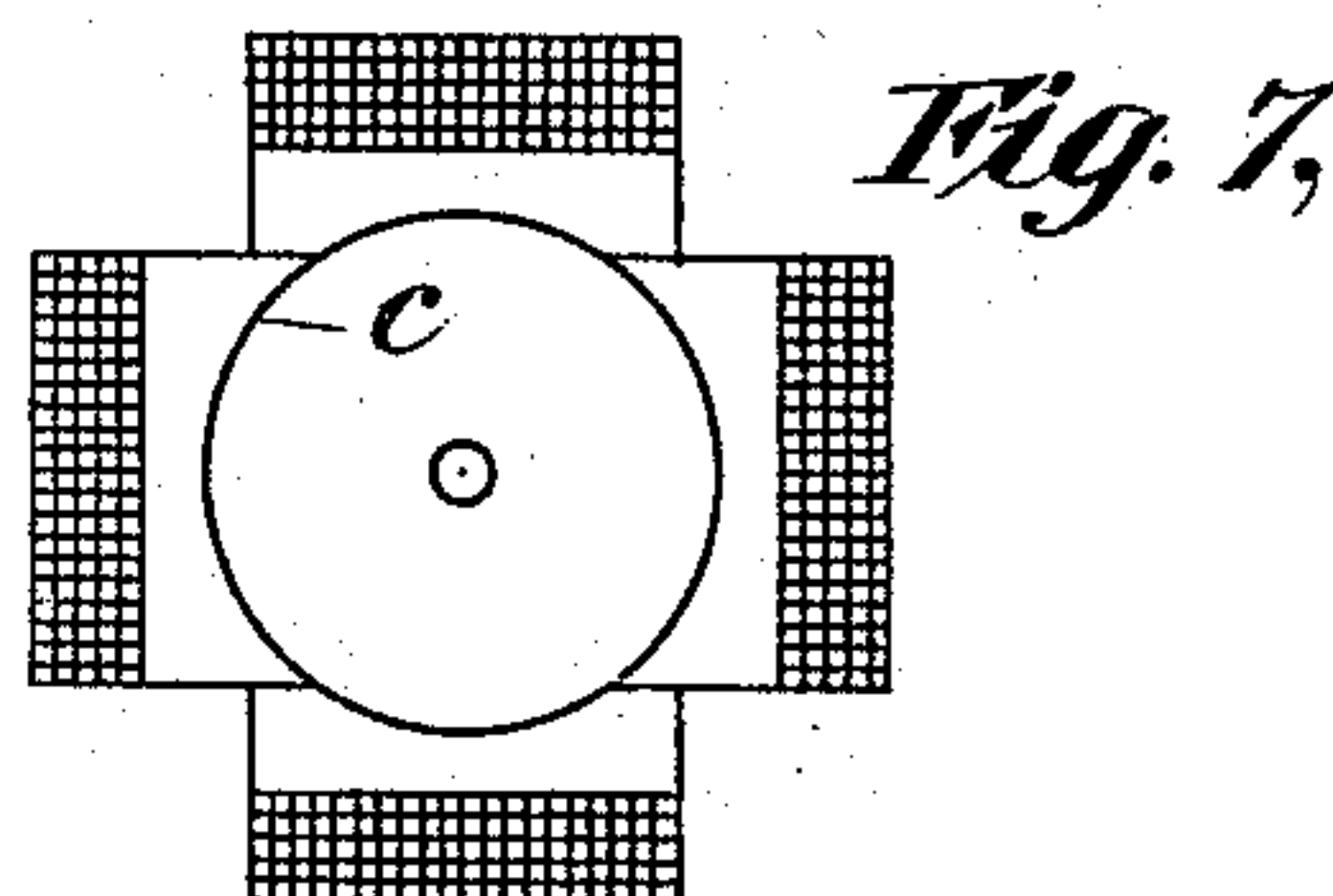


Fig. 7,

Fig. 5,

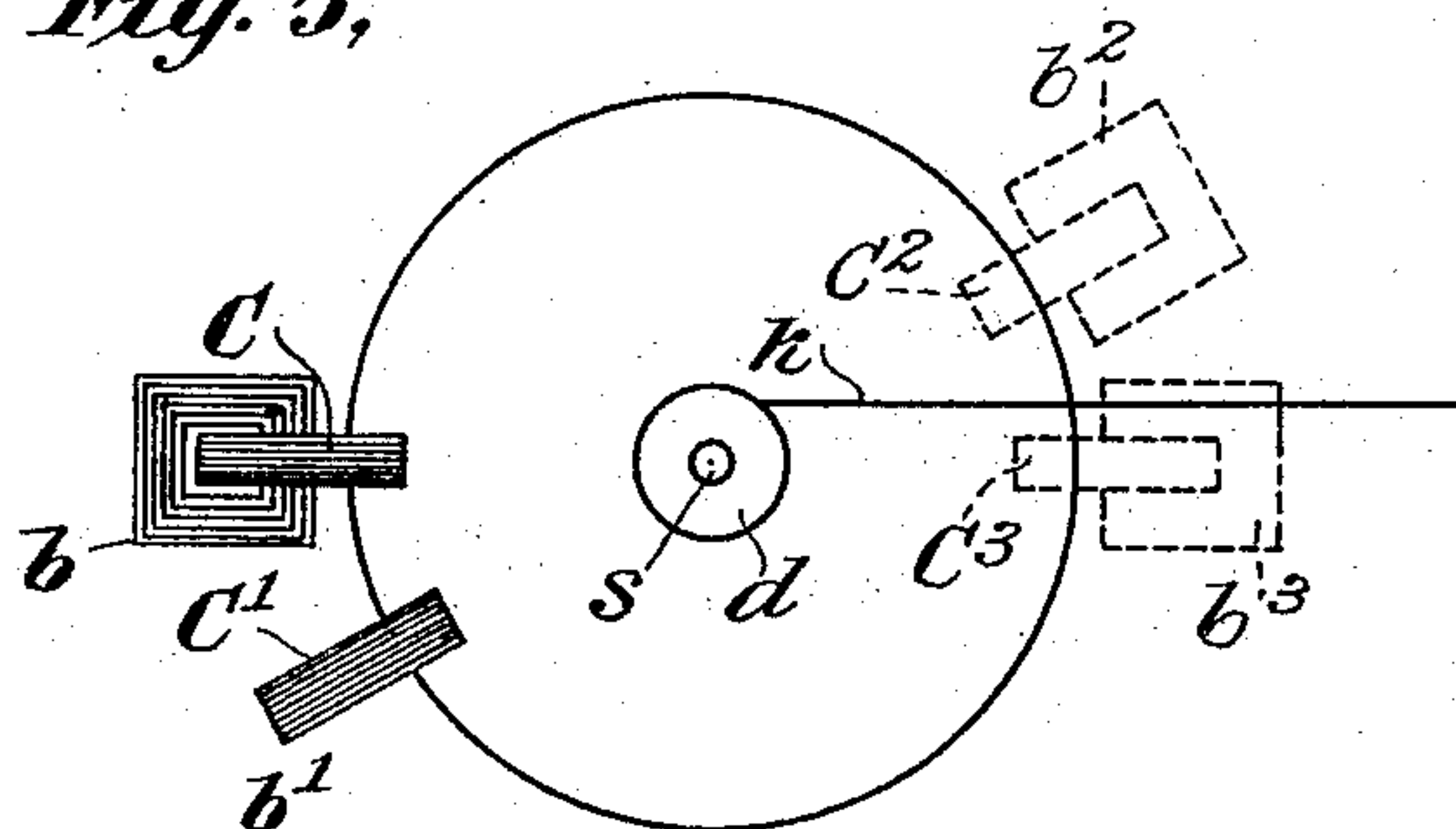
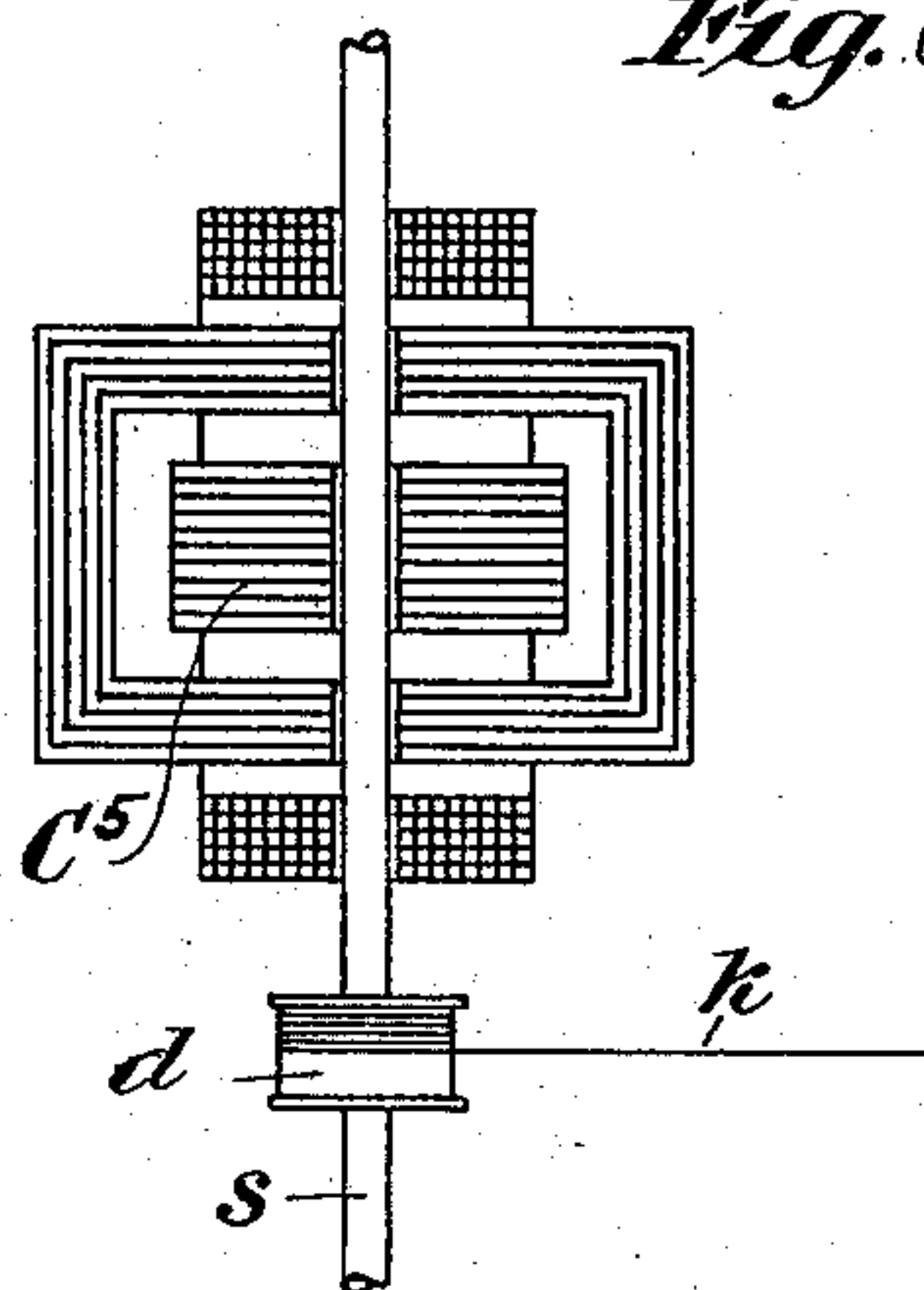


Fig. 8,



WITNESSES:

John P. Nowdston  
McM Robinson.

INVENTOR:

August Utzinger  
By his Attys,  
Charles J. Kintner



# UNITED STATES PATENT OFFICE.

AUGUST UTZINGER, OF NUREMBERG, GERMANY, ASSIGNOR TO SCHUCKERT & CO., OF SAME PLACE.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 506,890, dated October 17, 1893.

Application filed December 15, 1892. Serial No. 455,233. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST UTZINGER, a citizen of Switzerland, residing at the city of Nuremberg, Kingdom of Bavaria, Germany, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

My invention is directed particularly to improvements in electric arc lamps designed for use with alternating electric currents and its object is, to cheapen and simplify the working parts of this type of apparatus. I accomplish this object with the lamp hereinafter described and illustrated in the accompanying drawings in which—

Figure 1 is a side elevational view, and Fig. 2 a plan view of one form of my invention. Figs. 3 and 4 are similar views of a modified form of the invention. Figs. 5 and 6 are similar views of a third modified form, and Figs. 7 and 8 are vertical and horizontal sectional views of a fourth modified form of the invention.

Prior to my invention alternating current electric arc lamps had been, so far as I am aware, exclusively regulated by releasing devices controlling accompanying rack and pinion and analogous regulating mechanisms which carried the electrodes or carbons; clutching devices had also been used for a similar purpose.

My invention differs from all prior apparatus of this nature in that the apparatus acts positively and continuously tending to force the carbons positively apart, thereby affording a light of steady arc and avoiding the disagreeable flickering or jumping so noticeable in arc lamps of the nature above noted.

Referring now to the drawings, for a full, clear and exact understanding of the invention such as will enable others skilled in the art to construct and use it and first to Figs. 1 and 2, *a* is an electro-magnet having a laminated core *C*. Attached to one end of this core is a lateral pole piece *b*.

*c* is a copper disk secured to shaft *s* journaled in the frame of the lamp in any preferred manner, said disk lying in close proximity to the extended lateral pole piece *b*.

*d* is a drum carried by the shaft *s* and to it is attached a cord *k* extending around a

pulley *p* also journaled to the lamp frame. The free end of the cord *k* is attached to the upper end of the upper carbon holder *H* carrying the carbon or electrode *C'*, the other electrode *C''* being fixed to a rigid holder *H'* carried by the frame of the lamp. *w* is a conductor leading from the generator to the coil of the electro-magnet *a*, the other pole of the generator being connected to the fixed carbon holder as will be readily understood by skilled electricians.

The operation is as follows: Alternating currents set up through the coil of magnet *a* will cause the core *C* and its lateral pole piece *b* to set the disk *c* in rotation repelling it in the direction of the arrow and this for the reason that at every reversal of polarity first the core *C* of the electro-magnet and then the parts of the lateral pole piece *b* are magnetized, those parts of the pole piece most distant from the core being magnetized last. In other words a magnetic wave so to speak is set up from the core of the electro-magnet and continued to the end of the pole piece. By the generation of eddy currents in the copper disk *c* due to this wave a continuous torque or pull is effected on the disk, thus imparting motion to shaft *s* and through it, drum *d* and cord *k* to the upper electrode, thereby establishing the arc between the electrodes. As the arc lengthens the current supply of course weakens and allows the upper carbon to descend until the disk is held by the increased magnetic effect from magnet *a*, core *C* and pole piece *b*.

The modified form shown in Figs. 3 and 4 is the same in general structure as that shown in Figs. 1 and 2 except that the pole piece or polar extension of the core *C* in Figs. 1 and 2 is replaced by a copper disk *l* detached therefrom and held by extraneous means. In this instance the eddy currents generated in the copper disk *l* effect a similar shifting of the magnetic field and offer a repulsive effect on the disk.

In the modified form shown in Fig. 5 the shifting of the field is effected in the first instance by the induced effect of the core *C* on the adjacent core *C'* in this instance the poles of the cores embracing the disk between them. In the same figure is illustrated on the right



a method adapted to differential action consisting of two electro-magnets  $b^2 b^3$  having cores  $C^2, C^3$ , the coil  $b^2$  being in the lamp circuit and the coil  $C^3$  in a high resistance shunt circuit thereto as in well known forms of differential lamps. It is also apparent that in place of these two electro-magnets  $b^2 b^3$  any number of pairs of like magnets may be used if properly spaced and similarly connected in pairs. A periodic shifting of the field can also be effected by including both electro-magnets in the main circuit in series or by placing both in a shunt, provided they have different coefficients of self induction by being wound differentially or have cores adapted to set up varying or different current phases.

Figs. 7 and 8 illustrate an arrangement in which the magnetic field rotates in the well known way explained by Ferraris and exerts a torque or pull on a metallic body. In this instance the copper disk  $c$  is replaced by a cylinder which may be of copper or other conducting material. I have shown however this rotatable body as composed of thin wire disks  $C^5$  Fig. 8 insulated from each other by sheets of mica, paper or the like so that action of the eddy currents is replaced by that of magnetic lag. The lamp connections would of course be in this case as in the other figures of the drawings.

I do not limit my claims to the special forms of apparatus shown and described, as I believe it is broadly new with me to utilize eddy currents for regulating directly the positive feed of the electrodes in an electric arc lamp, which receives its operating current from an alternating current generator and my claims are directed broadly to the application of this generic principle.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. An alternating current arc lamp having a rotatable body of metal mechanically connected to one of the electrodes of the lamp

and acted upon by a continuously shifting magnetic field whereby the electrodes are positively separated and regulation effected, substantially as described.

2. An alternating current arc lamp having continuous acting regulating mechanism consisting of a rotating body or mass of metal mechanically connected to the electrodes and lying in the magnetic field of one or more electro-magnets adapted to set up a shifting magnetic field, substantially as described.

3. An alternating current arc lamp having regulating mechanism consisting of a movable or rotary mass of metal located in a shifting magnetic field which causes the mass to separate the electrodes and maintain them separated at proper distance as the field weakens, substantially as described.

4. An alternating current arc lamp having a copper or equivalent non-magnetic disk operatively connected to one of the electrodes of the lamp and lying in the magnetic influence of the pole or poles of one or more electro-magnets having each a laminated core and adapted to cause the disk to rotate, establish the arc and regulate its length, substantially as described.

5. An alternating current arc lamp having a movable electrode operatively connected to the rotary part of an electric motor the field magnet coils which are in circuit with the lighting current, the rotary part being without commutating devices, substantially as shown and described.

6. An alternating current arc lamp provided with a regulating electric motor with field magnet coils in circuit with the lamp, the rotary part being driven inductively and having no circuit connections with the propelling current, substantially as shown and described.

AUGUST UTZINGER.

Witnesses:

THEODOR STORT,  
JACOB BIERLEIN.

Corrections in Letters Patent No. 506,890.

It is hereby certified that in Letters Patent No. 506,890, granted October 17, 1893, upon the application of August Utzinger, of Nuremberg, Germany, for an improvement in "Electric Arc Lamps," errors appear in the printed specification requiring correction, as follows: In line 90, page 1, the reference letter *b* should be inserted after the word "extension"; line 4, page 2, the reference letter "*C*" should read *b*<sup>3</sup>, and line 77, same page, the word *of* should be inserted after the word "coils"; and that the Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 24th day of October, A. D. 1893.

[SEAL]

JNO. M. REYNOLDS,  
*Assistant Secretary of the Interior.*

Countersigned:

JOHN S. SEYMOUR.  
*Commissioner of Patents.*