

C. A. PFLUGER.
ELECTRIC ARC LAMP.

No. 539,393.

Patented May 14, 1895.

Fig. 4.

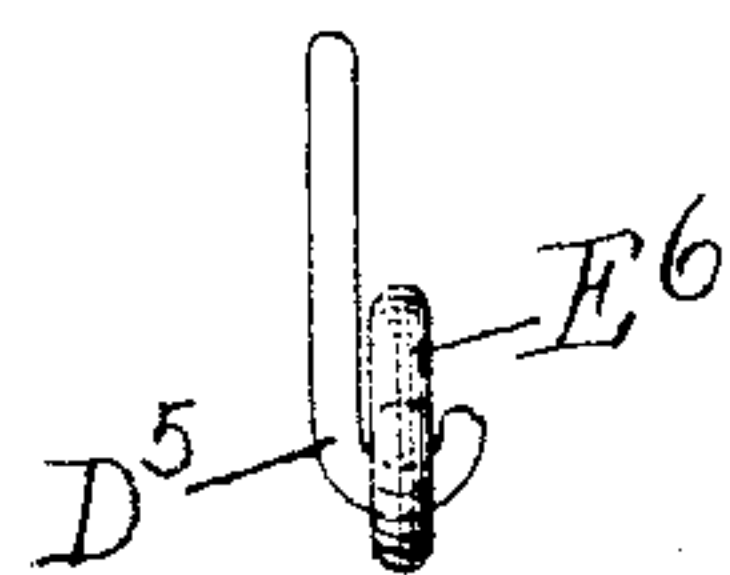
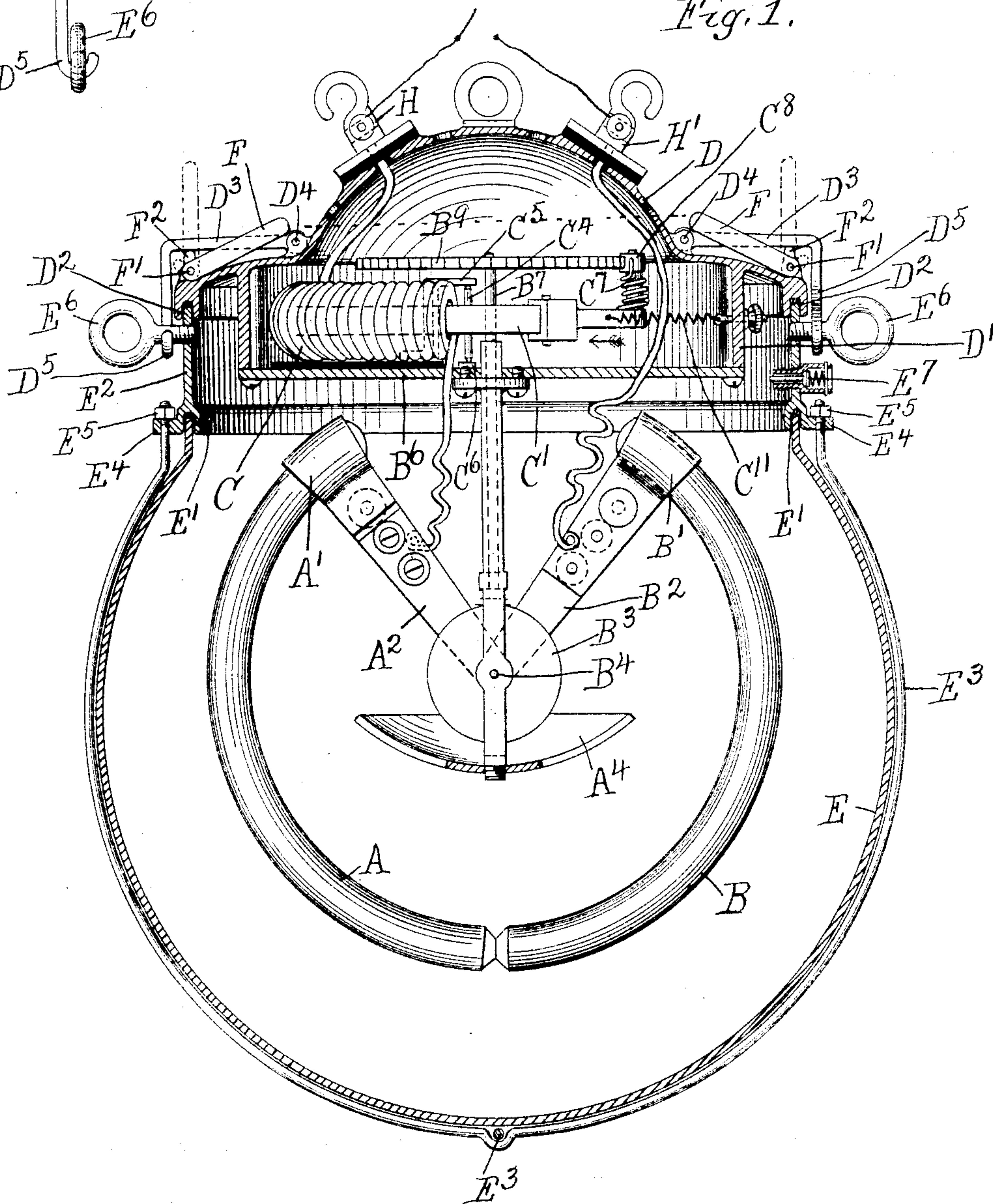


Fig. 1.



Witnesses,

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Walter J. Gunthorp

Inventor,
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by,

Frederic W. Parker,
his Atty.

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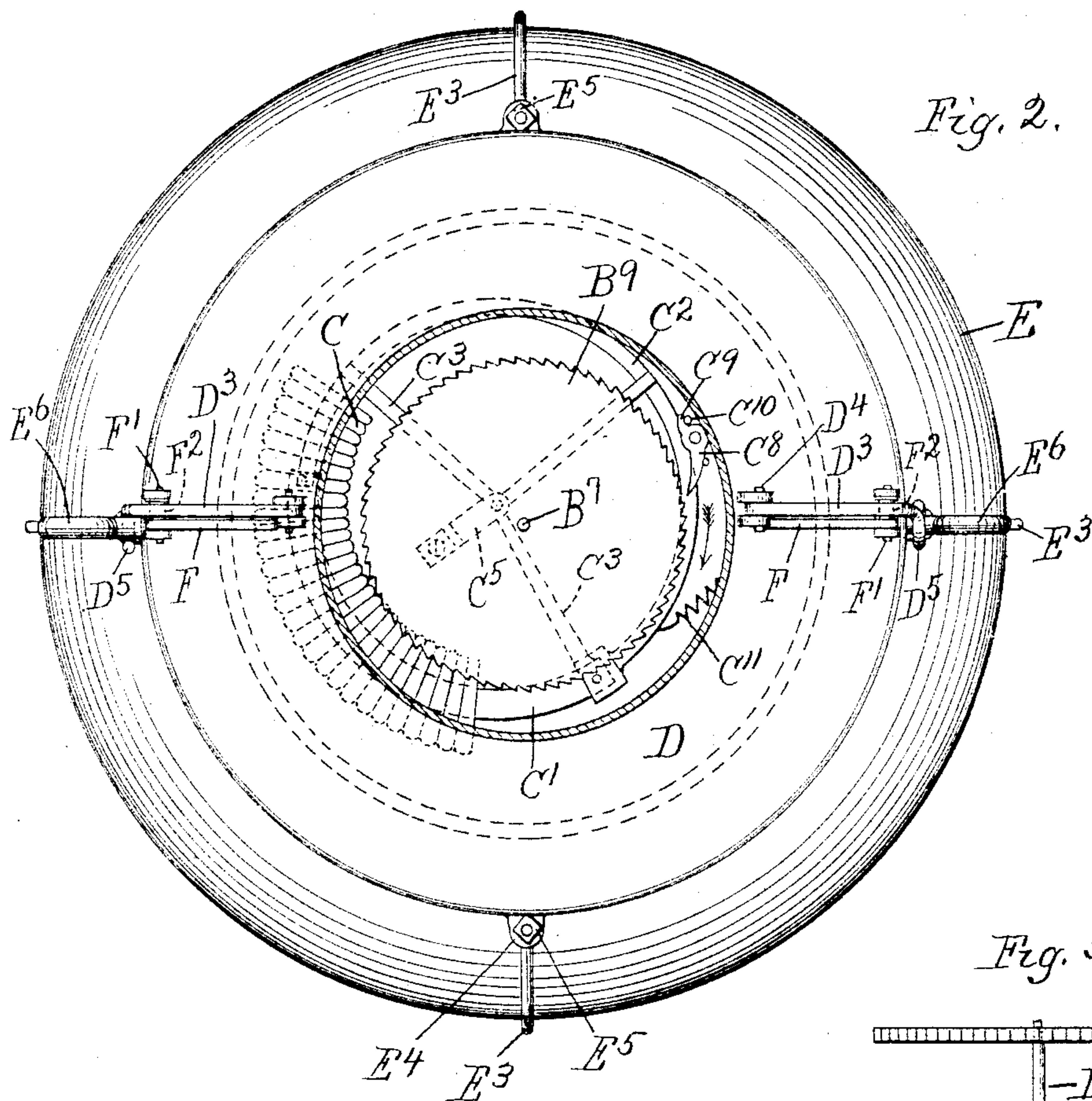


Fig. 2.

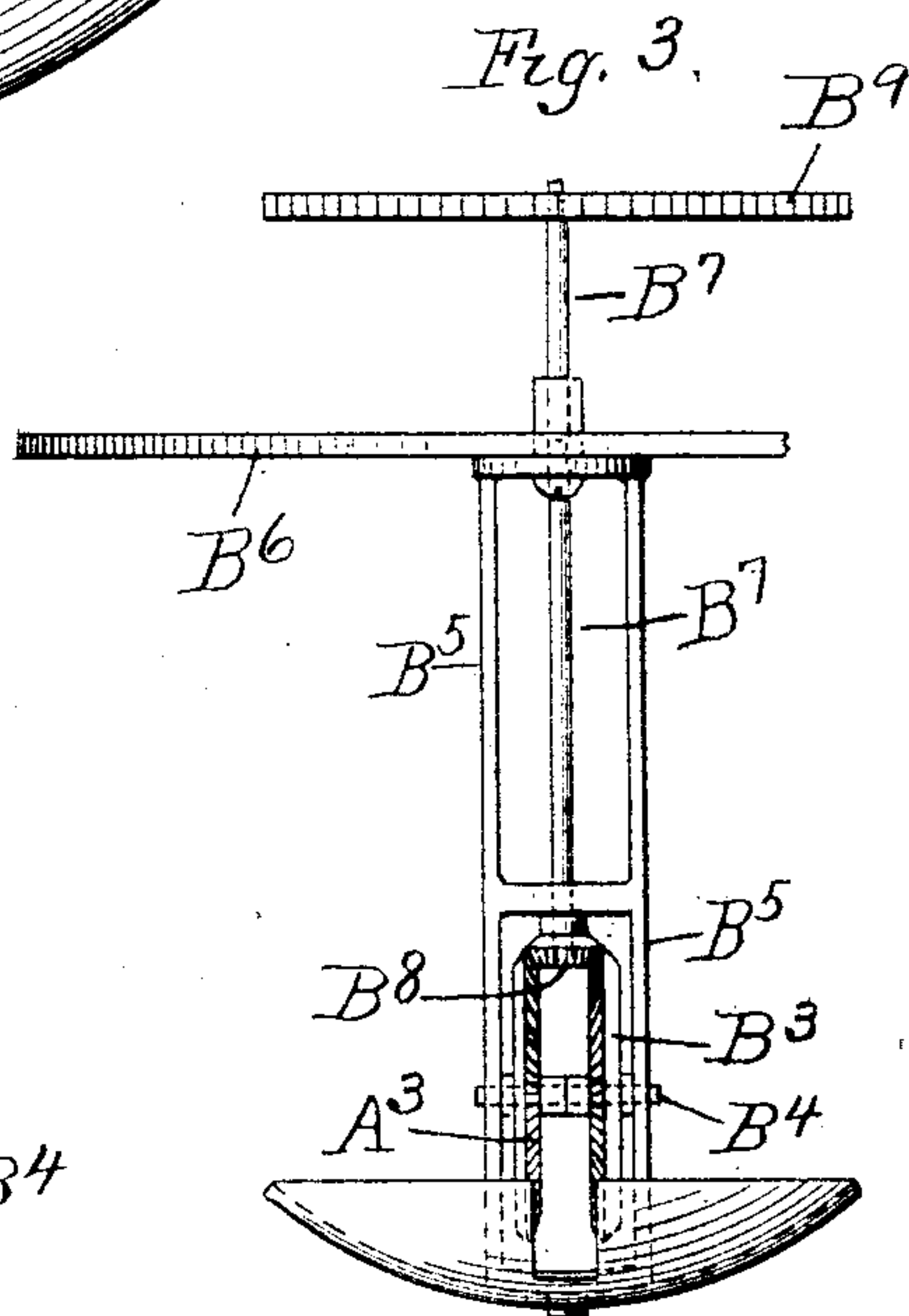


Fig. 3.

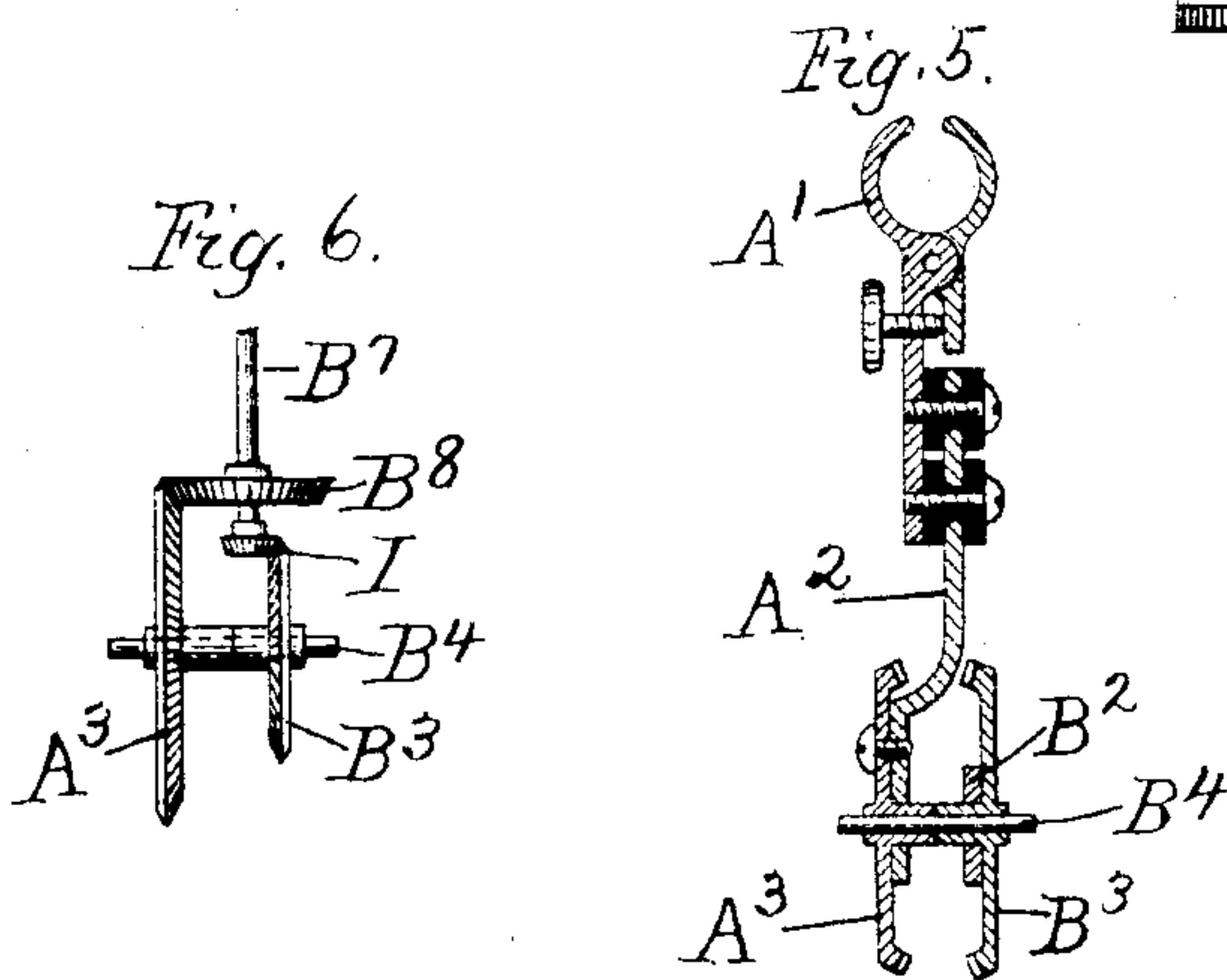


Fig. 5.

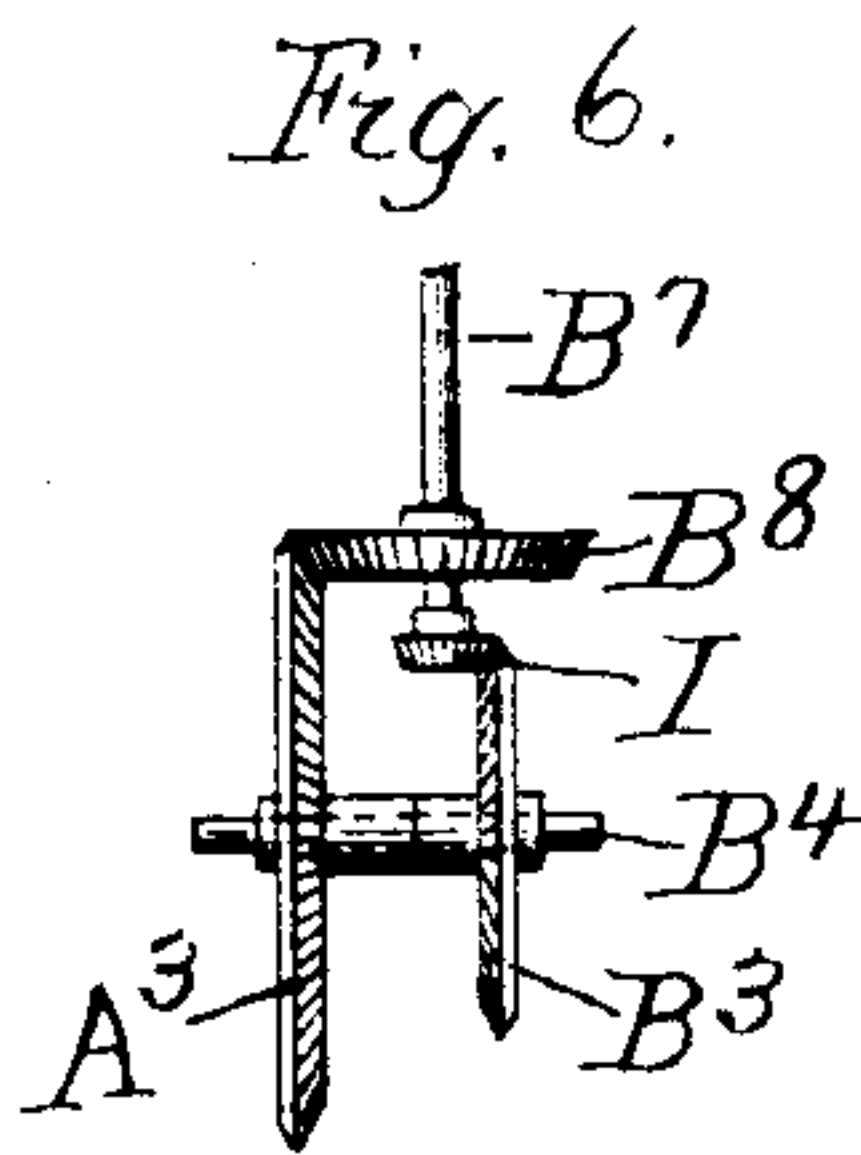


Fig. 6.

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UNITED STATES PATENT OFFICE.

CHARLES A. PFLUGER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE STANDARD ELECTRIC COMPANY, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 539,393, dated May 14, 1895.

Application filed July 2, 1894. Serial No. 516,327. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. PFLUGER, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Arc Lamps, of which the following is a specification.

My invention relates to arc lamps and has for its object to provide a new and improved arc lamp, of which the following is a description, reference being had to the accompanying drawings, wherein—

Figure 1 is a side view in part section. Fig. 2 is a plan view with parts broken away. Figs. 3, 4, and 5 are detail views. Fig. 6 is a modification of the carbon-moving pinions for a continuous-current lamp.

Like letters refer to like parts throughout the several figures.

The carbons A B preferably curved as shown, are held in the carbon holders, A' B' which are attached to the plates or strips A² B² but are insulated therefrom. (See Fig. 5.) These strips are each fastened to one of the bevel gears A³ B³ (see Fig. 5) so as to revolve therewith. Said bevel gears work on the shaft B⁴ having bearings in the supports B⁵. Said supports are fastened to the plate B⁶. A shaft B⁷ passes through the plate B⁶ and is provided at one end with the pinion B⁸ working between the bevel gears A³ B³ and at the other end with the ratchet wheel B⁹. The circular plate A⁴ is attached to the supports B⁵ which project below the bevel gears A³ B³. Said plate protects the gears from the heat of the arc and also acts as a reflector. Said plate is slotted to allow the passage of the strips A² B² when the carbons become short, the length of the slots being such that the motion of the carbons is stopped before the carbon holders come together. Resting upon the plate B⁶ but insulated therefrom is the solenoid C. The core C' of said solenoid is fastened to the piece C², preferably of non-magnetic material, the whole forming a circle or wheel as shown.

C³ C³ are arms projecting from the piece C² and meeting at the center of the circle. The pin C⁴ passes through said arms so as to form an axis for the wheel. Said pin works in bearings on the support C⁵ and block C⁶ as shown. By this arrangement the solenoid C'

and piece C² are mounted like the balance wheel of a watch and are free to oscillate.

The center of the ratchet wheel B⁹ is placed at one side of the center of the wheel formed by core C' and piece C⁶ so that the two wheels are not concentric.

An arm C⁷ projects upwardly from the piece C² and is provided with the pawl C⁸ adapted to engage the teeth on the ratchet wheel B⁹. A lug C⁹ on pawl C⁸ engages the pin C¹⁰ and limits its inward motion. A spring C¹¹ acts against the pull of the solenoid C. The plate B⁶ upon which the solenoid C rests is fastened to the annular piece or ring D' projecting from the top or cover D of the lamp and hence the solenoid and associated mechanism are entirely separated from the chamber containing the arc.

The globe E of the lamp is adapted to inclose the arc in a practically air tight chamber and fits into the groove E' in the annular piece or ring E² and is held in place by the wires E³ E³. Said wires pass through the lugs E⁴ on the ring E² and are held in place in any convenient manner as by nuts E⁵ E⁵.

E⁶ E⁶ are eye bolts projecting from the ring E².

E⁷ is an air valve opening outwardly to allow the pressure within the globe due to the heat of the arc, to be relieved. I may use ordinary pins or the like instead of eye bolts E⁶. One edge of said ring E² is adapted to fit into the groove D² on the lower edge of the top or cover D. This groove as well as the groove E' in ring E² is supplied with packing so that an air tight joint may be made. The bent levers D³ D³ are pivoted at D⁴ to the top or cover D and are provided at their free ends with the hooks D⁵ D⁵ (Fig. 4) adapted to engage the eye bolts E⁶ E⁶. The arms F F pivoted at F' F' are provided with the cams F² F² which are adapted to engage and lift the bent levers D³ D³ when the said arms are forced over so as to rest upon the top or cover D as shown in full lines. When the arms F F are in this position, the hooks D⁵ D⁵ are raised and on account of their engagement with the eye bolts E⁶ E⁶, the upper edge of the ring E² is forced against the packing in the groove D² so as to make a practically air tight joint.

H H' are the two binding posts of the lamp. The solenoid C is connected to the binding post H and to carbon holder A'. Carbon holder B' is connected to binding post H'.

5 The lamp as shown is an alternate current lamp and hence the carbons move with equal speed. When it is desired to use the lamp as a continuous current lamp, the carbon moving gears will be constructed as shown in Fig. 6. The pinion B⁸ engages the gear A³ and a smaller pinion I on the extended end of the shaft B⁷ engages the gear B³. The positive carbon is connected with the gear A³ and the negative carbon with the gear B³. By this arrangement the positive and negative carbons can be fed at different speeds and the arc kept approximately in the same place.

I have shown the lamp as having only a series coil but I may also use a shunt coil in connection with the series coil when desirable. The lamp may be supplied with any desirable cut-out.

It is evident that these several parts may be changed in form, construction and arrangement without departing from the spirit of my invention and I therefore do not wish to be limited to the construction shown.

The use and operation of my invention are as follows: When no current is flowing through the lamp the mechanism will be in the position shown in Figs. 1 and 2. When the current is turned on the solenoid C is energized and attracts its core C'. The wheel composed of the core C' and the piece C² is moved about its axis in the direction of the arrow carrying with it the pawl C⁸, (Fig. 2.) On account of the eccentric position of said wheel and the ratchet wheel B⁹, the pawl C⁸ engages the teeth of said ratchet wheel and moves it also in the direction of the arrow. The movement of said ratchet wheel is communicated by shaft B⁷ and pinion B⁸ to the gears A³ and B³ causing said gears to move in opposite directions. Since the carbons are connected to said gears, this movement separates said carbons, and forms the arc, the current being traced as follows: from binding post H to solenoid C; thence through carbon holder A' carbon A and carbon B to the negative binding post H'. When the length of the arc becomes too great, the current through the solenoid C is decreased and the spring C'' moves the core C' and pawl C⁸ in a direction opposite to that of the arrow and releases or partially releases the ratchet wheel B⁹. The weight of the carbons then acts to bring them nearer together. As the carbons burn away the pawl will be moved back until a tooth on the ratchet wheel slips past the pawl on account of the pawl's inward motion being limited and hence the entire carbons will in time be consumed.

The construction of the globe and its manner of attachment to the lamp allow the carbons to burn in a rarefied atmosphere and prevent oxygen from being admitted to the arc. Under these conditions the carbons last

much longer than when exposed to the air and hissing of the lamp is obviated. When it is desired to remove the globe for any reason as to recarbon the lamp, the arms F F are moved to an upright position as shown in dotted lines. The cams F² F² are then in an oblique position and the bent levers D³ D³ and hooks D⁵ D⁵ move downwardly so as to lower the globe E and ring E². When in this position the eyebolts E⁶ E⁶ may be lifted out of the hooks D⁵ D⁵ and the globe removed. When the eyebolts E⁶ E⁶ are again put in the hooks D⁵ and the arms F moved to their normal position, the upper edge of the ring E² is forced tightly against the packing in the groove D² so as to form a practically air tight joint. While the arms F F are in this position the globe cannot be removed. The air valve E⁷ allows the pressure in the carbon chamber to be relieved when the air is expanded by the heat of the arc.

The top or cover D of the lamp may be perforated within the annular projection D' so as to give the air free access to the chamber of the controlling mechanism.

It will be seen that I have here a lamp having two chambers one for the carbons and one for the controlling mechanism, the former being sealed so as to exclude the air and the latter in direct communication with the atmosphere.

The operation of the lamp is the same as described above when used with continuous currents or when a differential coil is used.

By this construction I get an economical and efficient lamp that will burn many hours without renewing the carbons. This lamp is also short and takes up very little room and is of such shape as to afford room for ornamentation.

I claim—

1. The combination in an arc lamp of two curved carbons, each attached to a bevel gear, a driving pinion meshing with both of said gears, a ratchet wheel connected to said pinion and adapted to rotate about a center, a solenoid having a rotatable core mounted eccentrically with respect to the said ratchet wheel, a spring or the like acting against said solenoid, a pawl connected with said core and adapted to engage said ratchet wheel whereby the carbons are fed, substantially as described.

2. The combination in an arc lamp of a solenoid, the core of which is adapted to rotate or move about a point or center, a pawl connected with said core, a ratchet wheel adapted to be engaged by said pawl and rotating about a different center and connections between the ratchet wheel and the carbons, whereby the carbons are fed, substantially as described.

3. An arc lamp comprising a solenoid, the core of which is adapted to move about a center, a ratchet wheel adapted to move about a different center and a pawl or the like connected to the solenoid core and adapted to engage the teeth of said ratchet wheel.

4. The combination in an arc lamp of a top
or cover, bent levers pivoted to said cover and
provided at one end with hooks adapted to
engage pins or the like associated with the
5 globe of the lamp, and pivoted arms provided
with cams adapted to engage said bent levers
whereby the globe is held in place, substan-
tially as described.

10 5. The combination in an arc lamp of a top
or cover provided with a groove at its under
edge, a globe attached to a ring, the upper
edge of which is adapted to fit into said

groove, pins or the like projecting from said
ring, bent levers pivoted to the top or cover
and provided with hooks adapted to engage 15
said pins, pivoted arms provided with cams
adapted to engage said levers and move them
so as to force the edge of the said ring up into
the groove in the cover and form an air tight
joint, substantially as described.

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Witnesses:

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