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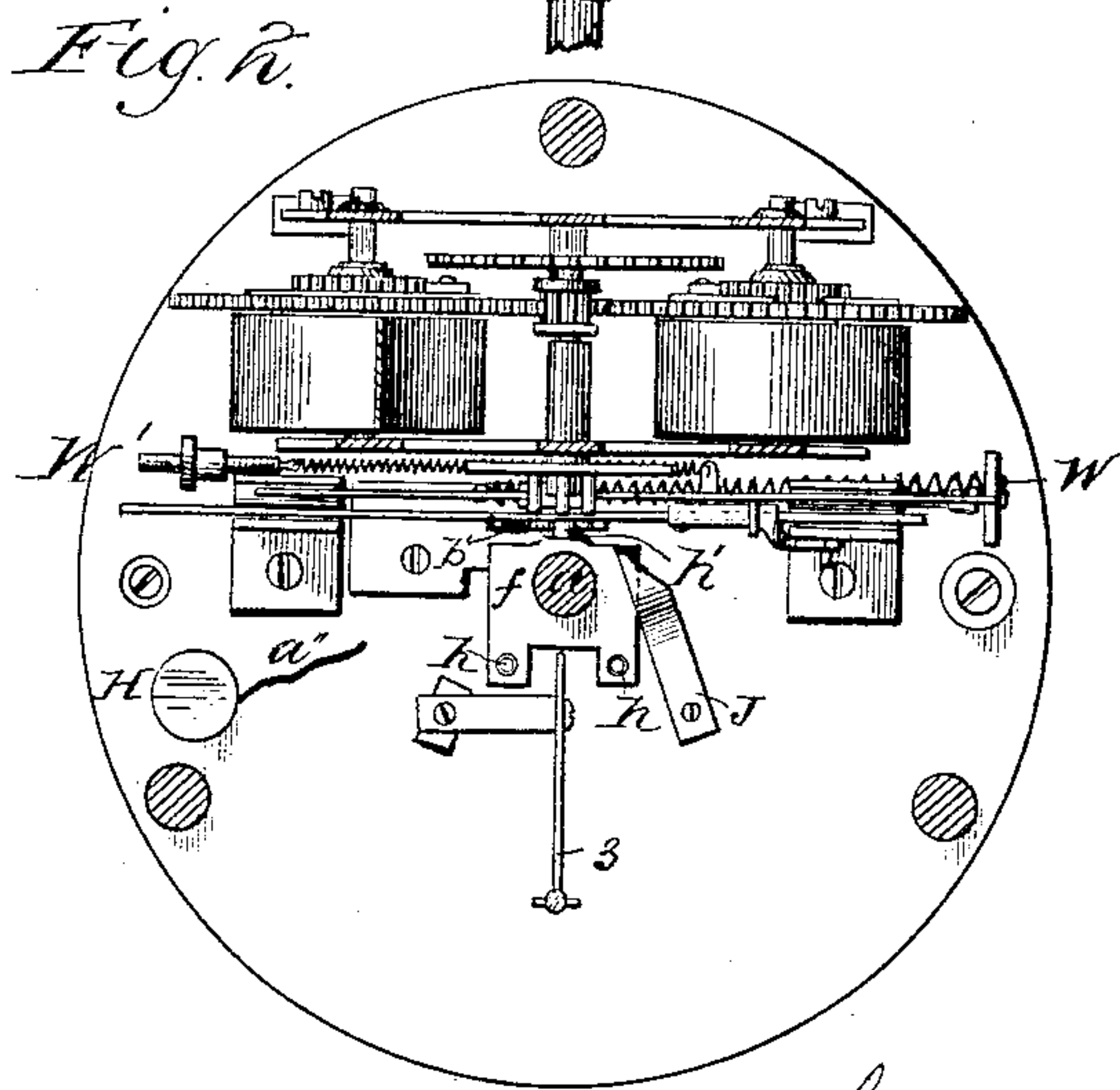
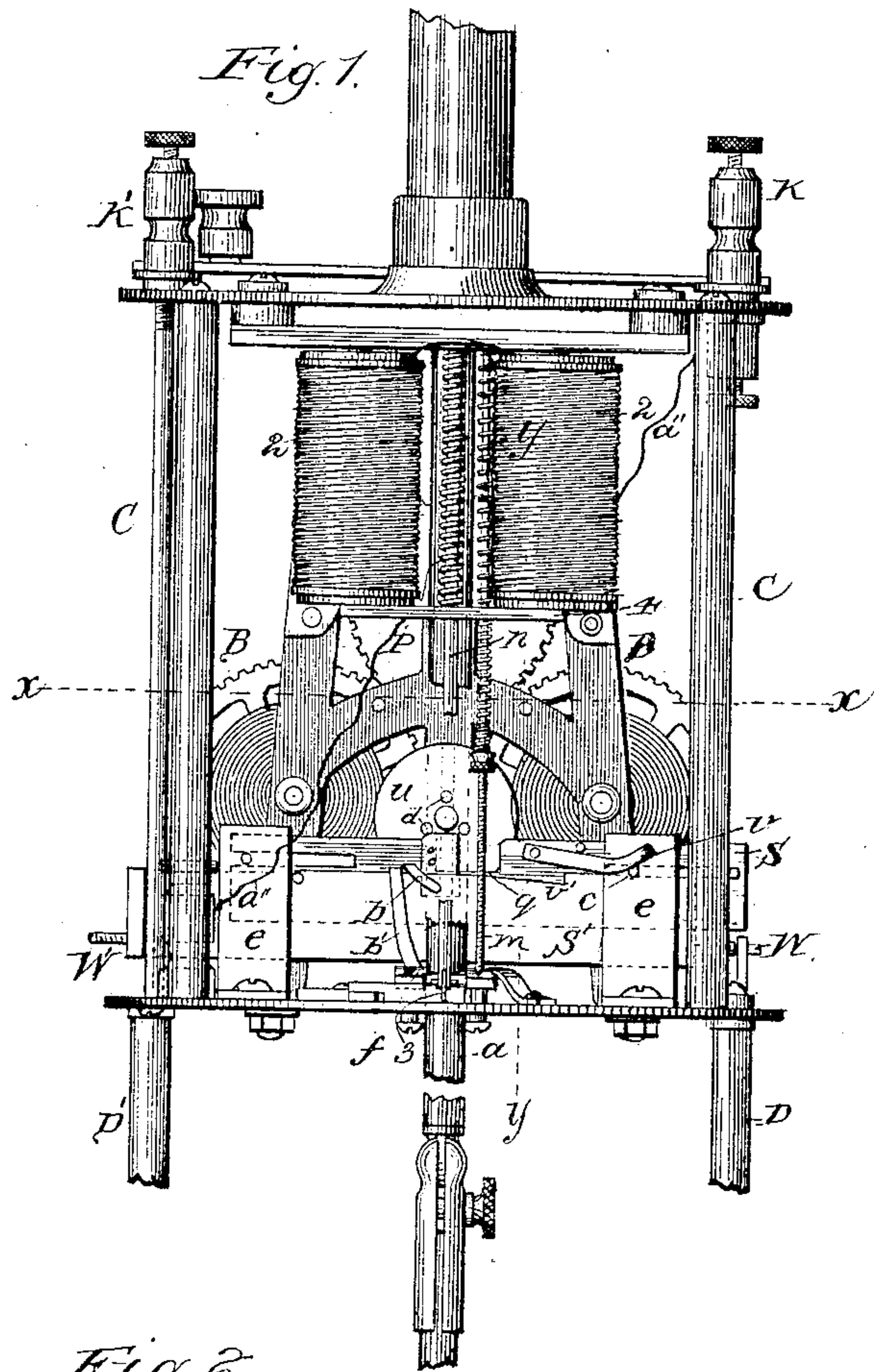
2 Sheets—Sheet 1.

G. A. GAGE & C. W. CRARY.

ELECTRIC ARC LIGHT.

No. 334,073.

Patented Jan. 12, 1886.



Witnesses.

Will R. Guohundro.

W. Rossiter.

Inventors

Gage Andrew Gage

By, Cushman Walker Crary

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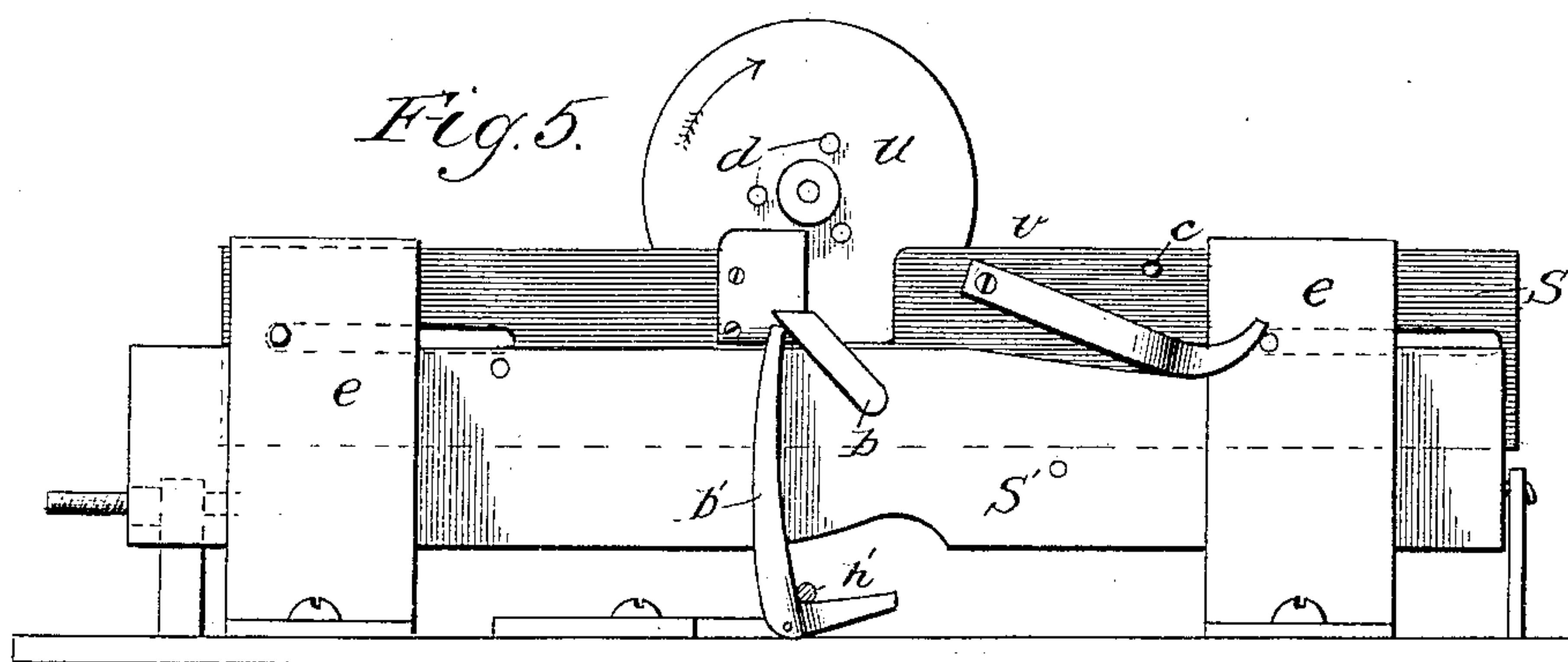
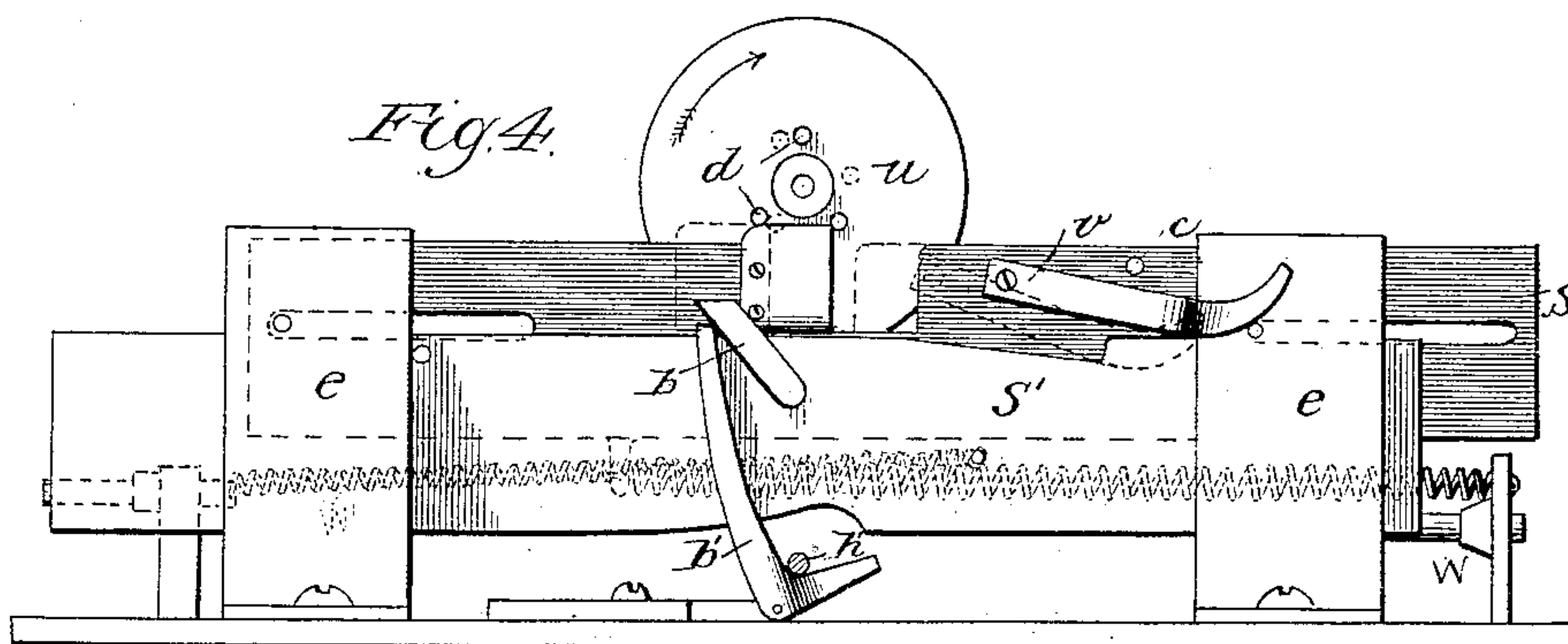
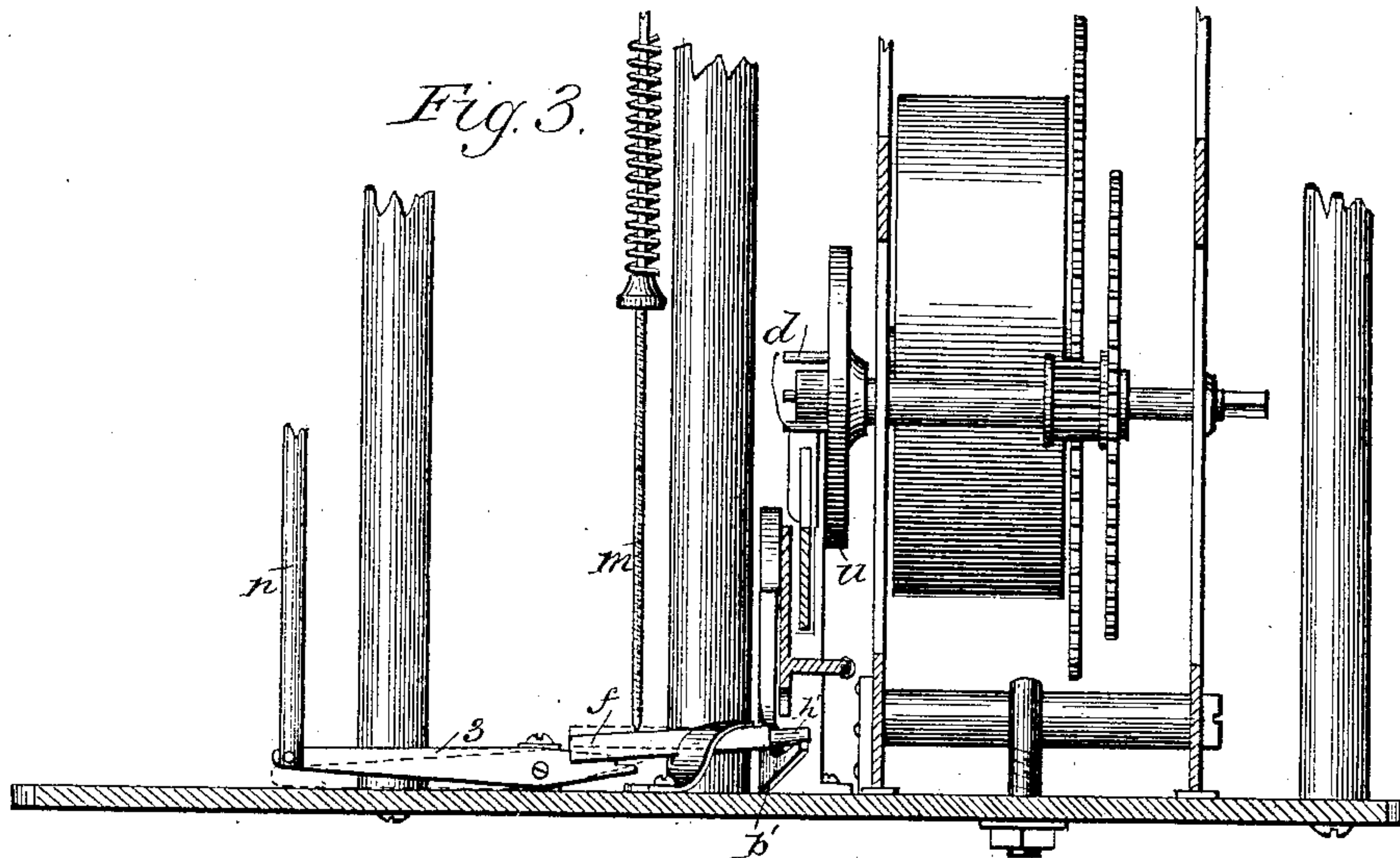
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UNITED STATES PATENT OFFICE.

GEORGE ANDREW GAGE AND CUSHMAN WALKER CRARY, OF CHICAGO, ILL.

ELECTRIC-ARC LIGHT.

SPECIFICATION forming part of Letters Patent No. 334,073, dated January 12, 1886.

Application filed January 17, 1885. Serial No. 153,183. (No model.)

To all whom it may concern:

Be it known that we, GEORGE ANDREW GAGE and CUSHMAN WALKER CRARY, of the city of Chicago, in the county of Cook, in the State of Illinois, have invented a new and useful Improvement in Electric-Arc Lights, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a front elevation having the carbon-holder *a* broken away to show the rear mechanism. Fig. 2 is a transverse section of Fig. 1 taken at *x x*. Fig. 3 is a vertical section of Fig. 1 taken through *y y*. Fig. 4 is a detailed (enlarged) view of the devices for feeding the carbon, having pawl *c* disengaged. Fig. 5 is an enlarged detailed view of same, having pawl *Y* at a point beginning to be disengaged.

Similar letters refer to similar parts throughout the similar views.

The object of my invention is to furnish a mechanical feed for the carbons of electric-arc lights instead of the feed produced by electro-magnets, as is commonly used.

In the drawings, *C* is the frame for carrying the several devices that compose the lamp and feeding devices for adjusting the carbon. *D* *D'* are rods connected to the same, (broken off in the drawings,) carrying the lower carbon in the usual manner.

B is a mechanical power operated by springs or weights. On any desirable shaft of the mechanical power we place a wheel, *u*, having several pins, *d*, in the face thereof. These pins, when the wheel is revolving, give motion to slide *S*, which gives motion to slide *S'*. The slides *S* and *S'* are carried in upright bearings *e*, which are fastened to the lower part of frame *C*, as shown in Fig. 1. The slide *S* is wider and projects above slide *S'*, and has a notch (shown at *g*, Fig. 1) into which the pin *d* of disk *u* passes, engaging against the left side as the pin-wheel moves in direction of the arrow. The pin moves slide *S* back until its pawl *v* falls into a notch (shown at *v'*) in slide *S'*. At this point the pin *d* passes away from the slide *S*, and the slide is carried back by spring *W*, and its pawl *v* having dropped into notch *v'* of slide *S'* this slide is carried along with it until the loose end of the pawl arrives at a pin, *c*, over which it rides and disengages it-

self, so that slide *S'* is free to go back to its starting-point, which is caused by a spring, *W'*. Slide *S'* has on its surface an inclined plane, (shown at *b*,) which presses against and operates the bell-crank *b'*. Bell-crank *b'* is also pivoted to the lower part of frame *C*, as shown in Figs. 4 and 5. This bell-crank gives motion and operates a solid clutch, *f*, that holds the carbon-holder *a*. The clutch *f* is pivoted at its outer end on two pins, (shown at *h*, Fig. 2,) and has on its inner end a projecting-pin *h'*, (shown in Figs. 2, 3, 4, and 5,) under which the lower end of the bell-crank *b'* is placed. It will be seen that as the bell-crank is moved at the upper end the lower end gives a vertical movement to that side of clutch *f*, thereby clamping the carbon-holder *a*, and holding it firmly until the bell-crank *b'* is released. The carbon-holder passes through the clutch *f*, and is held and fed forward or downward by it, and raises it to form the arc between the two carbons. *J* is a strap fastened to the frame *C*, Fig. 2, at one end. The other end passes over the top of clutch *f*, but left free to allow for the movement of the clutch. This holds the clutch down when the carbon-holder is pushed up to admit of a fresh carbon. On the end of clutch *f* is placed a spring-rod, *m*, the upper end of which rests against the frame *C*, as shown in Fig. 1. This spring allows a slight yielding on the outside of clutch *f* when it is operated, and at the same time aids in holding that side when the clutch cramps the holder, and when the clutch *f* is released it aids in bringing the clutch back to the cramping position.

On the under side of the upper part of frame *C* there are fastened two electro-magnets, 2. These magnets are made of the same sized wire as the field-wire, and are for the purpose of operating devices that raise the outside of the clutch *f* to a horizontal position to allow the carbon to fall when the electricity is stopped, and thereby put the carbons in position to form the circuit when the dynamo is started. This device consists of a lever, 3, pivoted on the main frame, Fig. 3, and is connected to the armature 4 of magnets 2 by rod *h*. When the electricity makes the magnetic force in passing over the wires, the armature 4 is drawn up, lifting up lever 3 at its outer end and freeing its inner end from the clutch *f*,

which assumes its place for feeding. The pins *h*, on which the clutch is pivoted, are so arranged as to allow that side of the clutch *f* a slight vertical movement.

5 A spiral spring, *P*, is placed over the armature 4, that aids in forcing the outer end of lever 3 down and raises the clutch *f* at its outer end. *K* is the positive pole, which is insulated as it passes through the frame *C*. To it
10 the circuit-wire is attached at the top. At its lower end is attached the wire *a''*, that passes around the poles of the magnet 2, and gives magnetic power to the same. The wire *a''*, after forming the magnets, is attached at its
15 lower end to post *H* on the lower part of the frame *C*, which is not insulated. *K'* is a post fastened to a side, *D'*, which carries the holder at the bottom for the lower carbon. The side rod, *D'*, is insulated at the points where it
20 passes through frame *C*. By this arrangement of the poles and magnet the electricity passes from the positive pole *K* through the magnet, and down through the carbons, and up the side rod, *D'*, to the field-wire connected to the
25 negative pole *K'*.

The operation of this arc light is as follows: The mechanical power being wound up and the electricity passing over the wire, the magnet lifts the armature and raises the outer end
30 of lever 3, thus freeing it from the clutch *f*, which is then in position to do its work. The power being also started, the pin-wheel *u* in passing around engages slide *S*, and draws it along until its pawl *v* falls into the notch in
35 slide *S'*. At this point the pin passes away from the slide and allows it to be thrown back by its spring *W*, carrying along with it slide *S'* until the pawl is disengaged by pin *c*, when slide *S'* is immediately forced back by its spring
40 *W'*, and presses the upper part of the bell-crank *b'*, thereby raising the inside of clutch *f*, which clamps the carbon-holder and gives

it sufficient lift to form the arc, the bell-crank *b'* having first been released as the slide *S'* passes from the position of the pawl shown in 45 Fig. 5 to that shown in Fig. 4. The reason that the clutch *f* operates the carbon-holder is lifting one side (the inner) it clamps the same, and when lowered it brings the hole of the clutch in direct line with other bearings 50 of the holder.

What we claim, and are desirous of securing by Letters Patent, is—

1. In an electric-arc light, a mechanical power, *B*, pin-wheel *u*, slides *S* and *S'*, bell-crank *b'*, in combination with a clamp, *f*, for the purpose of giving an intermittent downward and upward motion to the carbon to preserve a uniform arc, substantially as described. 55

2. In an electric-arc light, spring-rod *m*, clutch *f*, bell-crank *b'*, and carbon-holder *a*, in combination with the clock-work *B*, pin-wheel *u*, and slides *S* and *S'*, all constructed and arranged to operate substantially as set forth. 60

3. In an electric-arc light, magnet 2, armature 4, lever 3, and clutch *f*, in combination with the bell-crank *b'*, slides *S* and *S'*, pin-wheel *u*, clock-work *B*, constructed and arranged to operate substantially as and for the 65 purpose set forth.

4. In an electric-arc light, a mechanical power, *B*, pin-wheel *u*, slide *S*, pawl *v*, slide *S'*, and inclined plane *b*, in combination with bell-crank *b'*, clutch *f*, and carbon-holder *a*, all 70 acting conjointly, substantially as and for the purpose set forth.

Signed at Chicago, in the State of Illinois, this 26th day of December, 1884.

GEORGE ANDREW GAGE.

CUSHMAN WALKER CRARY.

Witnesses:

JAS. LORENZO GAGE,

CHARLES A. FOLSOM.