

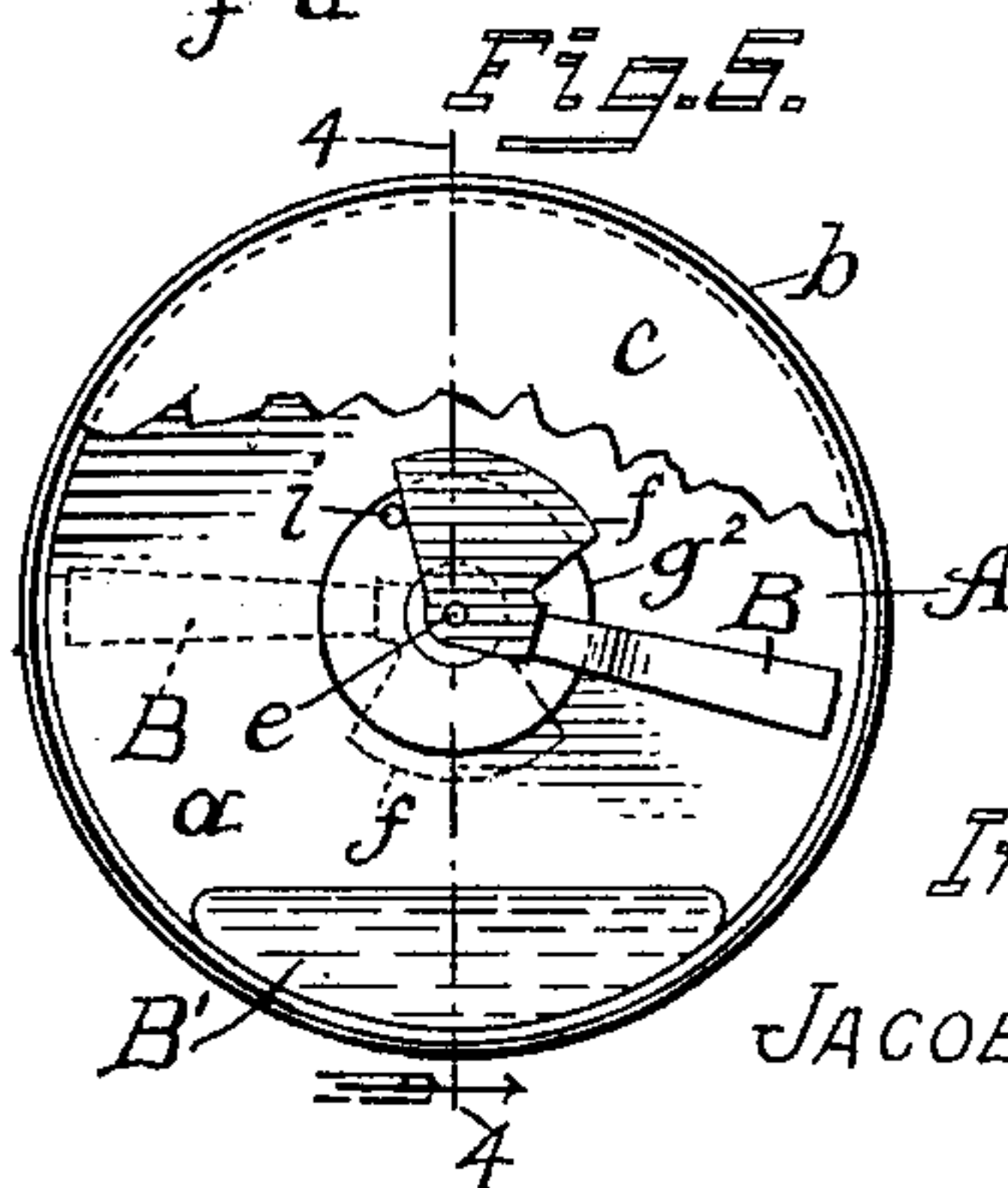
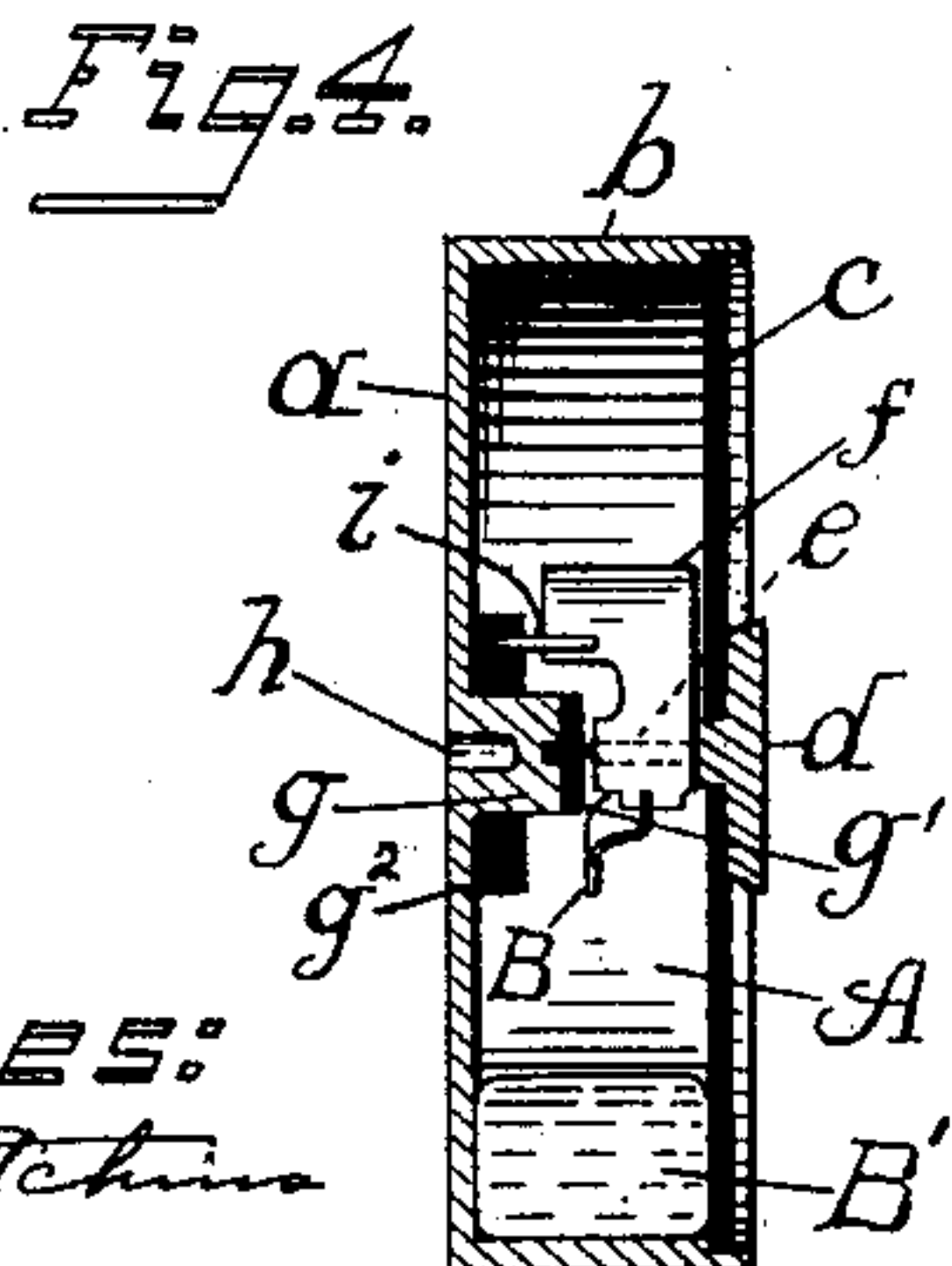
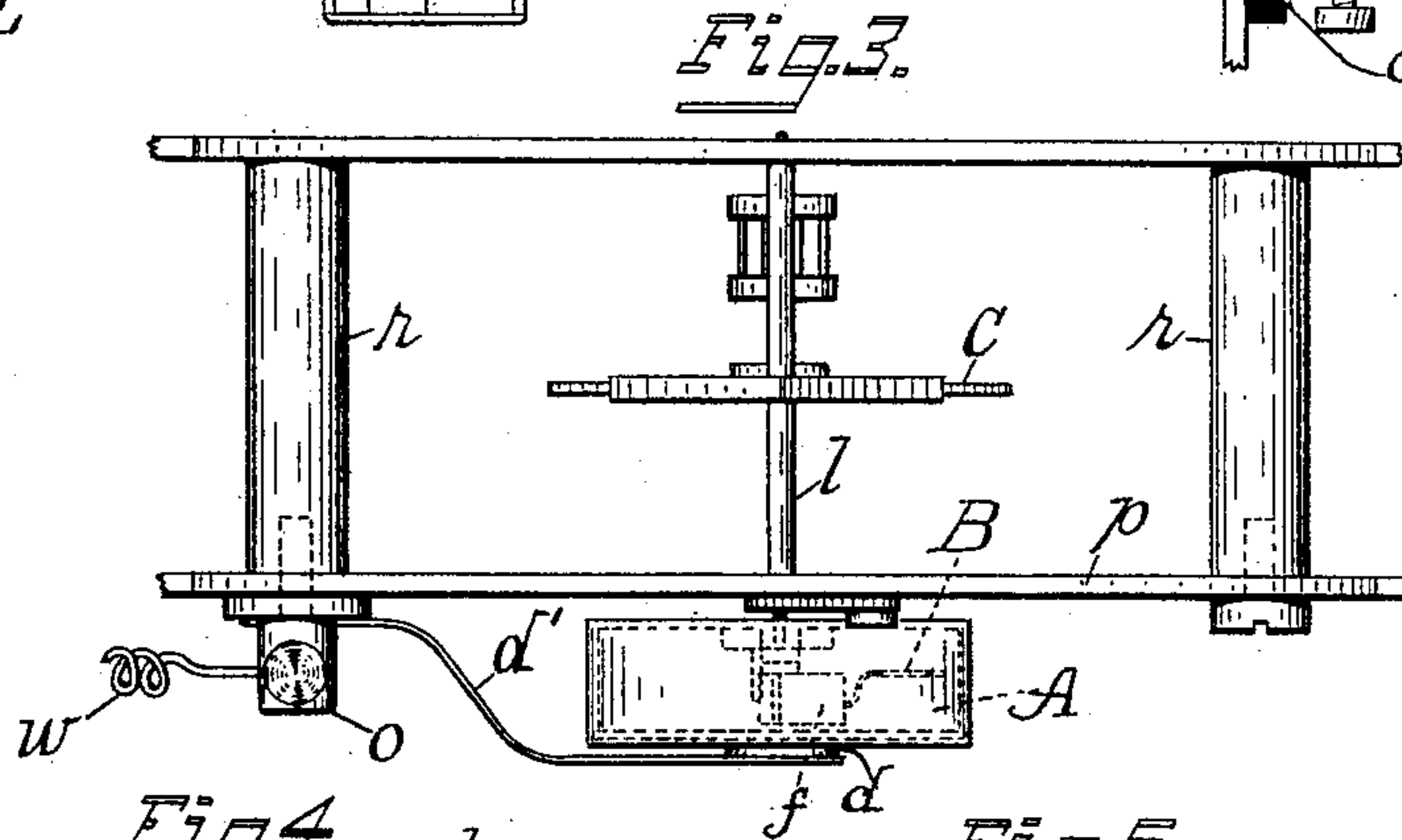
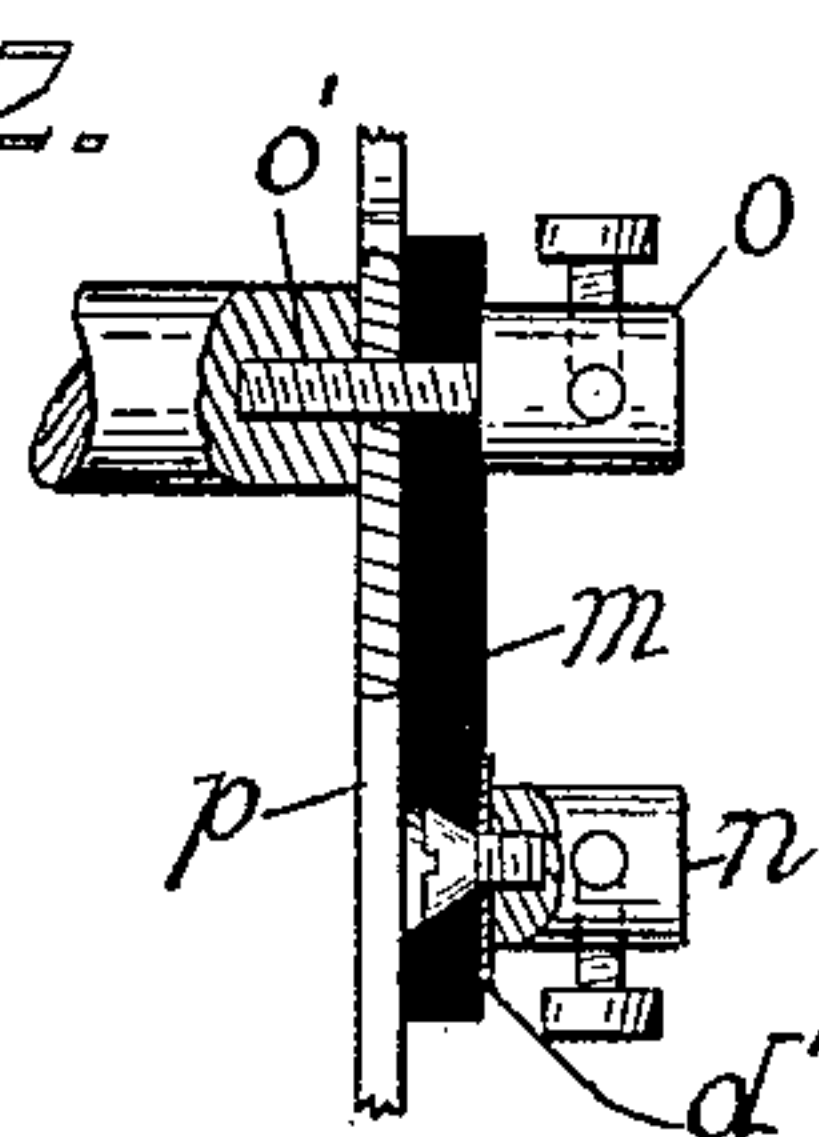
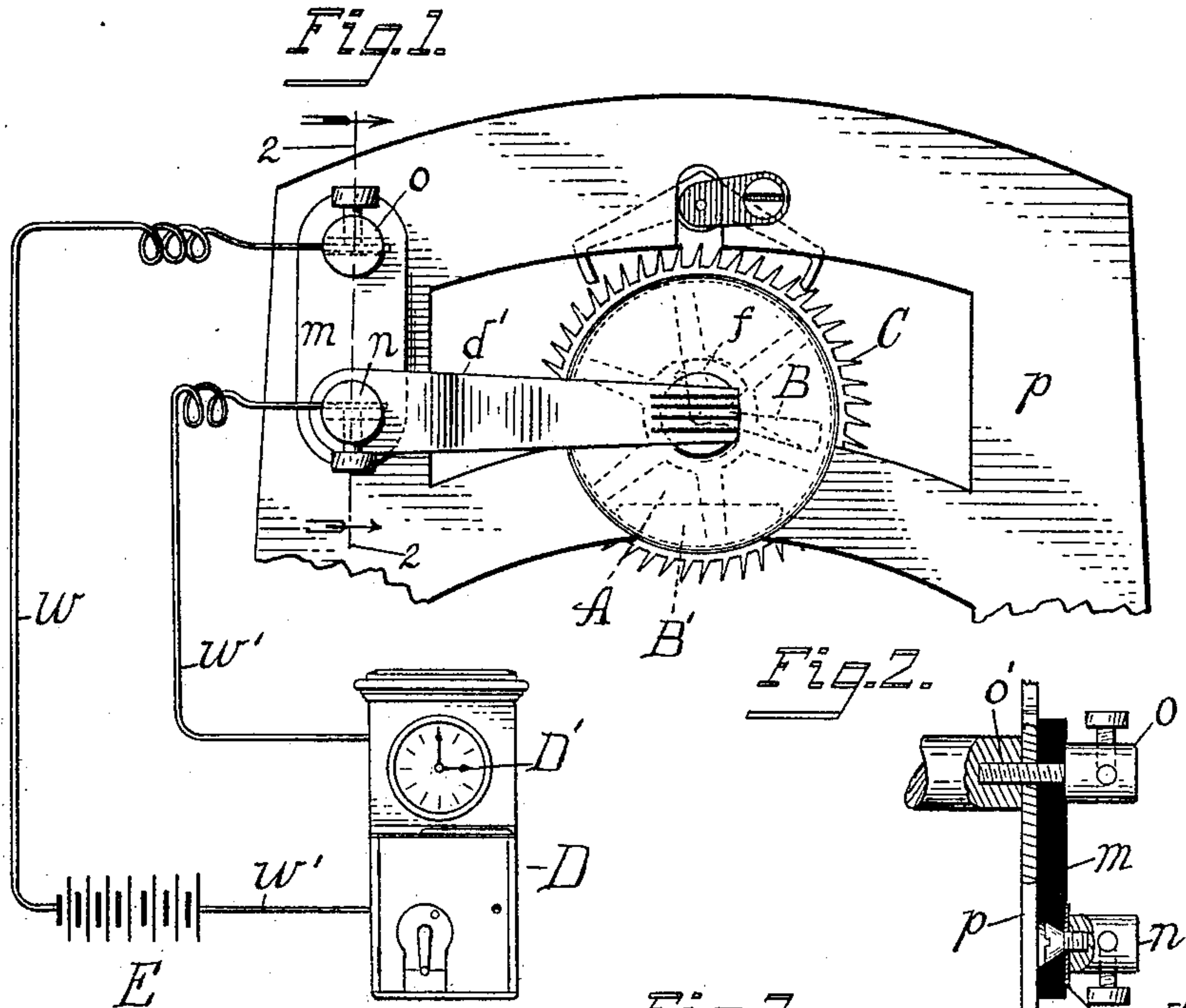
No. 636,486.

Patented Nov. 7, 1899.

J. J. BUSENBENZ.  
ELECTRIC CIRCUIT CLOSER.

(Application filed Mar. 13, 1899.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

JACOB J. BUSENBENZ, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE NATIONAL TIME RECORDER COMPANY, OF SAME PLACE.

## ELECTRIC-CIRCUIT CLOSER.

SPECIFICATION forming part of Letters Patent No. 636,486, dated November 7, 1899.

Application filed March 13, 1899. Serial No. 708,927. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB J. BUSENBENZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Electric-Circuit Closers, of which the following is a specification.

My invention relates to an improvement in devices for automatically closing an electric circuit, and I have more especially devised it for use in connections where the work of the electric current is required to be performed momentarily at predetermined intervals, as in the case of an electrically-actuated clock, though my invention is not intended to be limited to that particular application.

In the accompanying drawings, wherein my improvement is illustrated in the particular connection referred to, Figure 1 is a view illustrating part of a clock mechanism, in broken elevation, with my improved circuit-closer, shown partly by dotted lines, operatively applied to it in circuit with a time-recorder; Fig. 2, a section taken at the line 2 on Fig. 1, viewed in the direction of the arrows and enlarged; Fig. 3, a broken plan view of the portion of the clock mechanism presented in Fig. 1 with my improved device connected therewith; Fig. 4, a vertical transverse section of the circuit-closer, taken at the line 4 on Fig. 5 and viewed in the direction of the arrow; and Fig. 5, a broken view of the same in front elevation.

As shown, my improved circuit-closer comprises the following-described construction:

A is a chamber, by preference of circular shape and which may be best formed out of a piece of sheet-steel to afford the base *a* and the annular rim *b*, the chamber having an airtight cover *c*, preferably of glass. A metal contact *d* is fastened to the center of the insulating-cover *c* and has a stud *e* extending from it into the chamber, on which is loosely journaled at one end a contact-finger B in the form of a thin and preferably sharp-edged strip of metal somewhat shorter than the radius of the chamber. On its inner end the finger B carries a weight *f*, shown in the form of a hatchet-head, with the finger extending from it like the handle of a hatchet. The gravity tendency of the head *f* is to return

the contact-finger to its normal position (indicated by dotted lines on Fig. 5) when removed therefrom. From the center of the base *a* there projects into the chamber A a hub *g*, into which there extends from its outer end a socket *h*. The hub is covered at its inner end with insulating material *g'* and is surrounded, contiguous to the inner surface of the base *a*, with an insulating-ring *g''*, carrying a finger *i*, projecting across the plane of the head *f* to engage therewith.

Within the chamber A is confined a body of mercury B', extending into the path of the finger B, and for the sake of economy in the use of the mercury the chamber A should be exhausted as far as practicable of air.

The principle of operation of my improved circuit-closer involves the rotation of the chamber A, with the contact B' remaining stationary, to bring the actuating-finger *i* into engagement with the contact B, as at its head *f*, to turn it from its normal position, indicated by the dotted lines in Fig. 5, to or beyond that shown by the full-line representation in the same figure till the head is carried far enough beyond the line of balance to cause it, by gravity, to flop over and quickly sweep the finger B edgewise through the mercury B'. With the device included in an electric circuit maintained normally open by the normal separation of the contacts B and B' when the latter are brought together the circuit is closed.

To illustrate the operation, I show my improved circuit-closer seated at the socket *h* on the projecting end of the shaft *l* of the escapement-wheel C of a clock-movement to rotate with the shaft. On the lower end of a strip *m* of insulating material are secured a contact-brush *d'* and a binding-post *n*, and the insulating-strip *m* is fastened at its upper end by the screw-stem *o'* on a binding-post *o* through the front plate *p* of the clock-movement frame to one of the spacing-rods *r* of the frame. D represents a time-recorder, which may involve any well-known or suitable construction containing a clock (indicated at D') of a variety adapted to be run electrically, and E denotes an electric generator including in its circuit the clock D' by a wire *w*, connecting the binding-post *o* with



one side of the generator, and a wire  $w'$ , leading from the opposite side of the generator through the electric actuating mechanism (not shown, but which may involve any well-known construction) in the clock to the binding-post  $n$ . In each revolution of the shaft  $l$ —thus, once every minute—the chamber  $A$  makes a complete turn, in which the finger  $i$  engages the weight  $f$  in its normal position and carries it and the finger  $B$  around to their positions shown by the full-line representation in Fig. 5, from which the weight drops ahead of the actuating-finger to its normal position, (there to await another engagement by the actuating-finger,) in reaching which the contact  $B$  sweeps through the mercury  $B'$  and momentarily closes the circuit from the battery over the wire  $w$ , binding-post  $o$ , metal of the main clock-frame, chamber  $A$ , and mercury  $B'$  to the finger  $B$ , contact  $d$ , brush  $d'$ , binding-post  $n$ , and wire  $w'$  through the electrical mechanism in the clock  $D'$  back to the battery. Under the momentary closure of the circuit the electrical mechanism in the clock  $D'$  is actuated in the usual way to turn the clock-hands to advance them one minute.

While the construction shown and described of my improved circuit-closer is the best known to me for its purpose, the invention is not limited to the particular details, which may be variously modified by those skilled in the art without departure from the invention. For example, the contact  $B'$  is not indispensably mercury, though mercury is preferred for obvious reasons, nor need the weighted contact  $B$  nor the chamber  $A$  be of the particular form illustrated.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an electric-circuit closer, the combination of a rotatable chamber containing a relatively stationary contact, and a contact supported in said chamber to turn independently thereof and sweep across said stationary contact to close the circuit.

2. In an electric-circuit closer, the combination of a rotatable chamber containing a relatively stationary contact, a contact-finger journaled in said chamber to turn independently thereof and weighted to sweep across said stationary contact in attaining its normal position controlled by the weight, and engaging means in said chamber movable therewith and into the path of which said weighted contact extends to be engaged and turned on its support, substantially as described.

3. In an electric-circuit closer, the combination of a rotatable chamber containing a relatively stationary contact, a contact-finger journaled in said chamber to turn independently thereof and weighted to sweep across

said stationary contact in attaining its normal position controlled by the weight, and an engaging finger projecting in said chamber and movable therewith to extend into the plane of said finger and turn it from its normal position, in the rotation of the chamber, to a position whence the weight actuates it, substantially as described.

4. In an electric-circuit closer, the combination of a rotatable chamber containing a mercury contact, a contact-finger journaled in said chamber to turn independently thereof and weighted to sweep across the mercury in attaining its normal position controlled by the weight, and engaging means in said chamber movable therewith and into the path of which said finger extends to be engaged and turned on its support, substantially as described.

5. In an electric-circuit closer, the combination of a circular chamber rotatable on its central axis and exhausted of air and containing a mercury contact bearing on the rim portion, a contact-finger journaled in said chamber to turn independently thereof and weighted to sweep across the mercury in attaining its normal position controlled by the weight, and engaging means in said chamber movable therewith and into the path of which said finger extends to be engaged and turned on its support, substantially as described.

6. In an electric-circuit closer, the combination of a circular chamber rotatable on its central axis and containing a mercury contact bearing on the rim portion, a contact-finger carrying at one end a weight and journaled in said chamber to turn independently thereof, and a finger projecting in said chamber across the plane of said weight to engage therewith in the rotation of the chamber and carry the contact-finger from its normal position, controlled by the weight, to a point whence the gravity of the weight flops said contact-finger over through the mercury, ahead of the engaging finger, to its normal position, substantially as described.

7. An electric-circuit closer comprising, in combination, a chamber  $A$  containing a mercury contact  $B'$  and provided with a cover  $c$  of insulating material, a contact  $d$  on said cover having a bearing  $e$  projecting into the chamber, a contact-finger  $B$  carrying a weight  $f$  and loosely journaled on said bearing, and an insulated finger  $i$  in said chamber, rotatable with it, and projecting across the plane of said weight to engage it in each rotation of the chamber, the whole being constructed and arranged to operate substantially as described.

JACOB J. BUSENBENZ.

In presence of—

R. T. SPENCER,  
D. W. LEE.