

No. 712,630.

Patented Nov. 4, 1902.

C. E. ZIMMERMANN.  
HIGH OR LOW WATER ALARM.

(Application filed Dec. 5, 1901.)

(No Model.)

3 Sheets—Sheet 1.

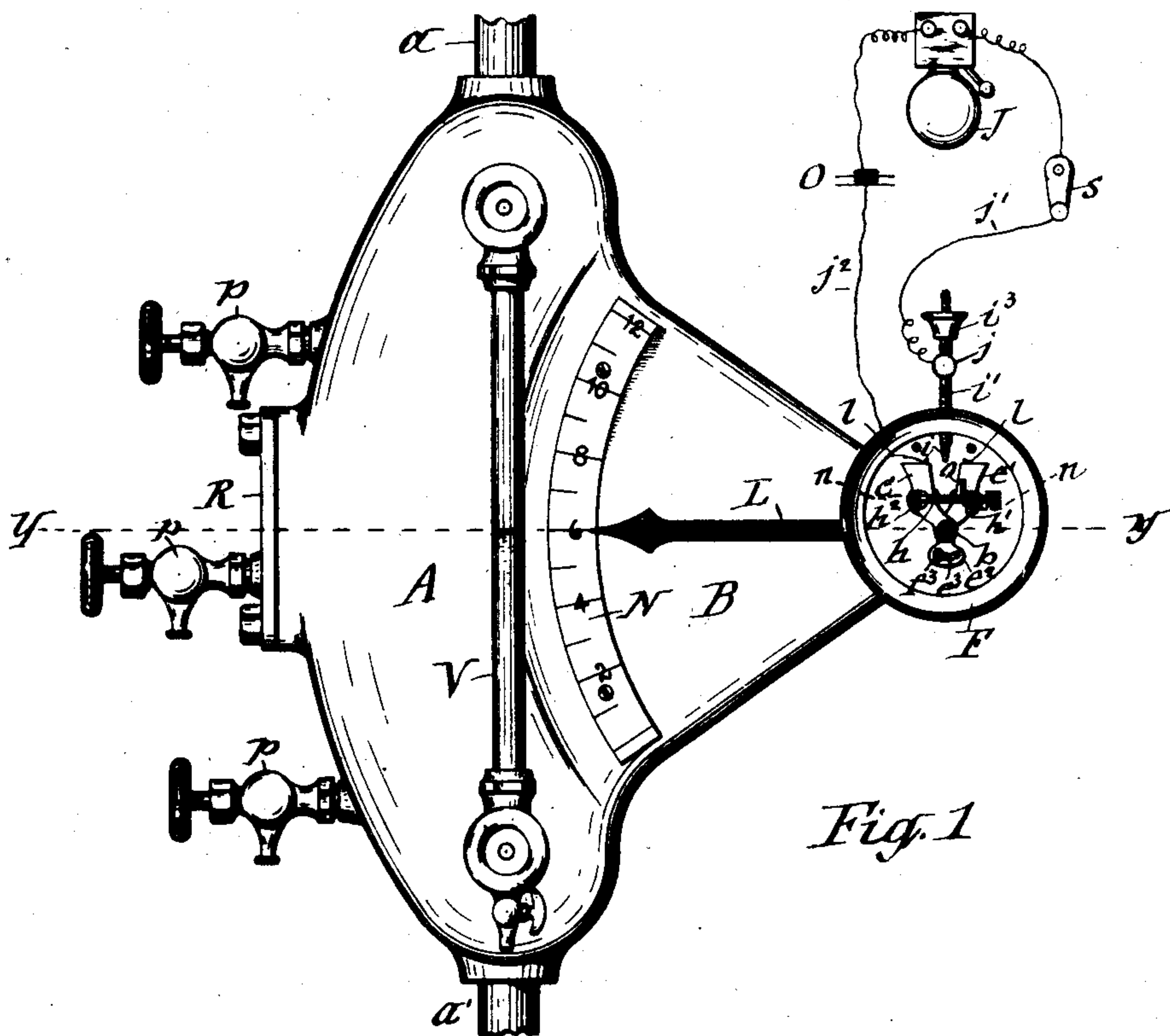


Fig. 1

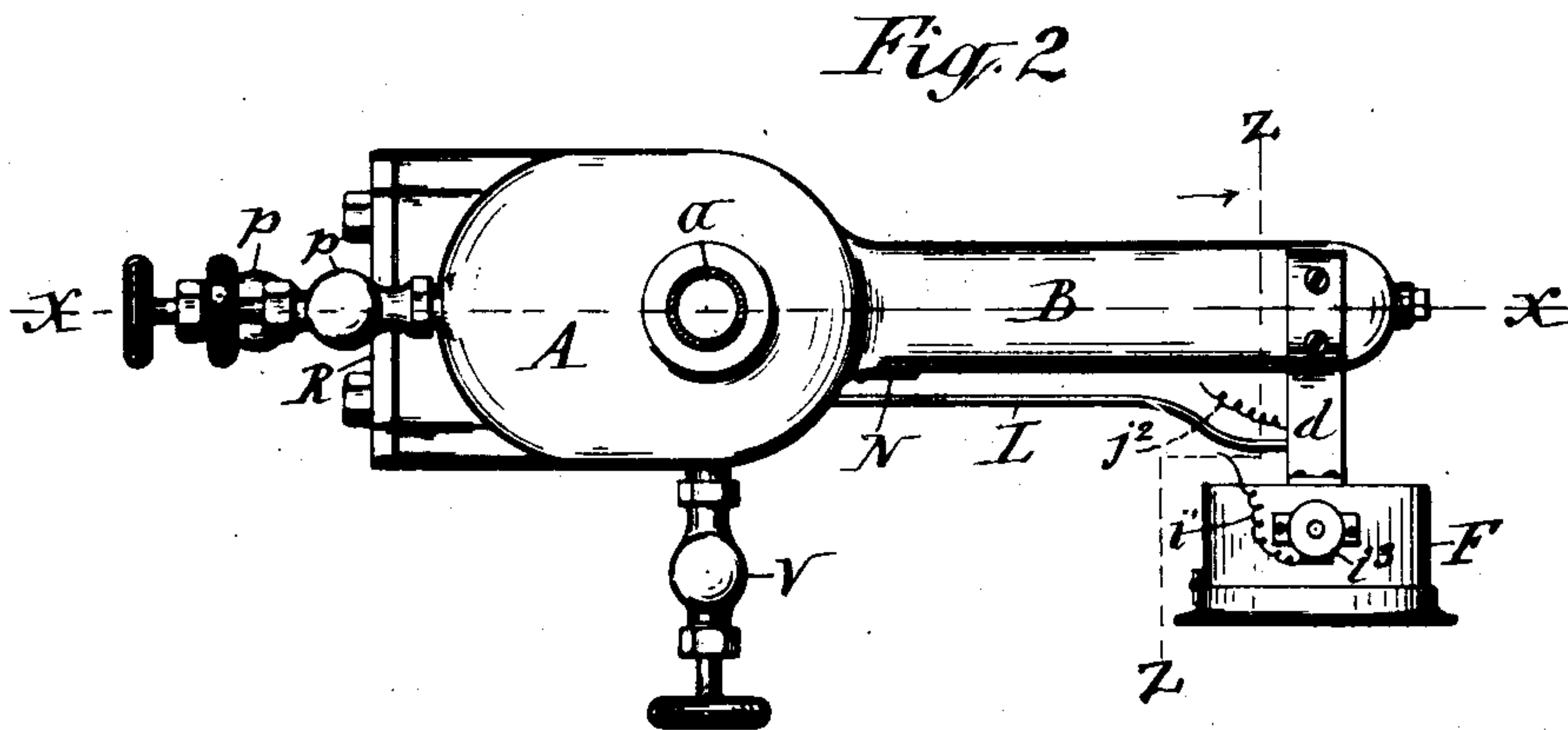


Fig. 2

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**No. 712,630.**

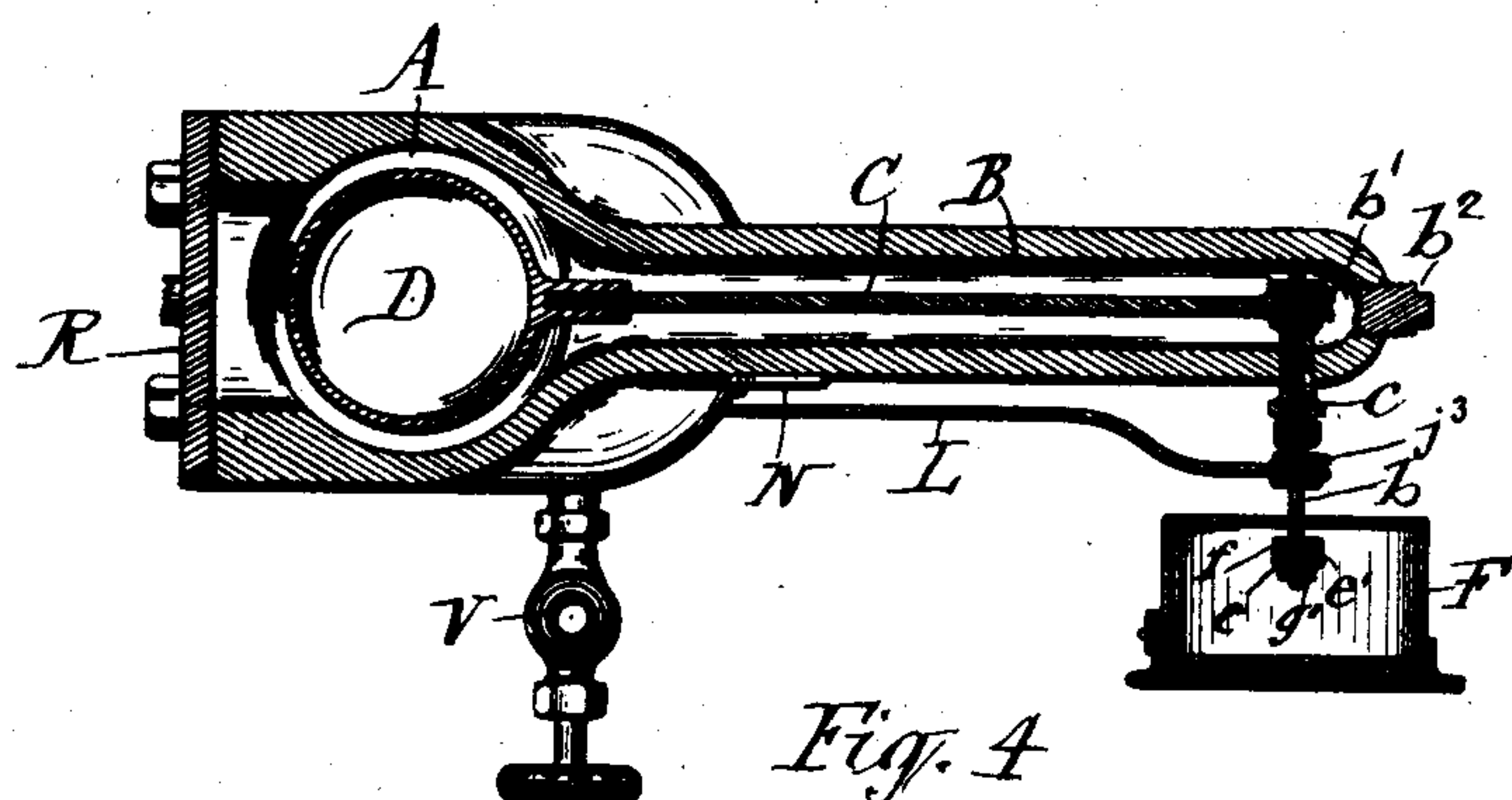
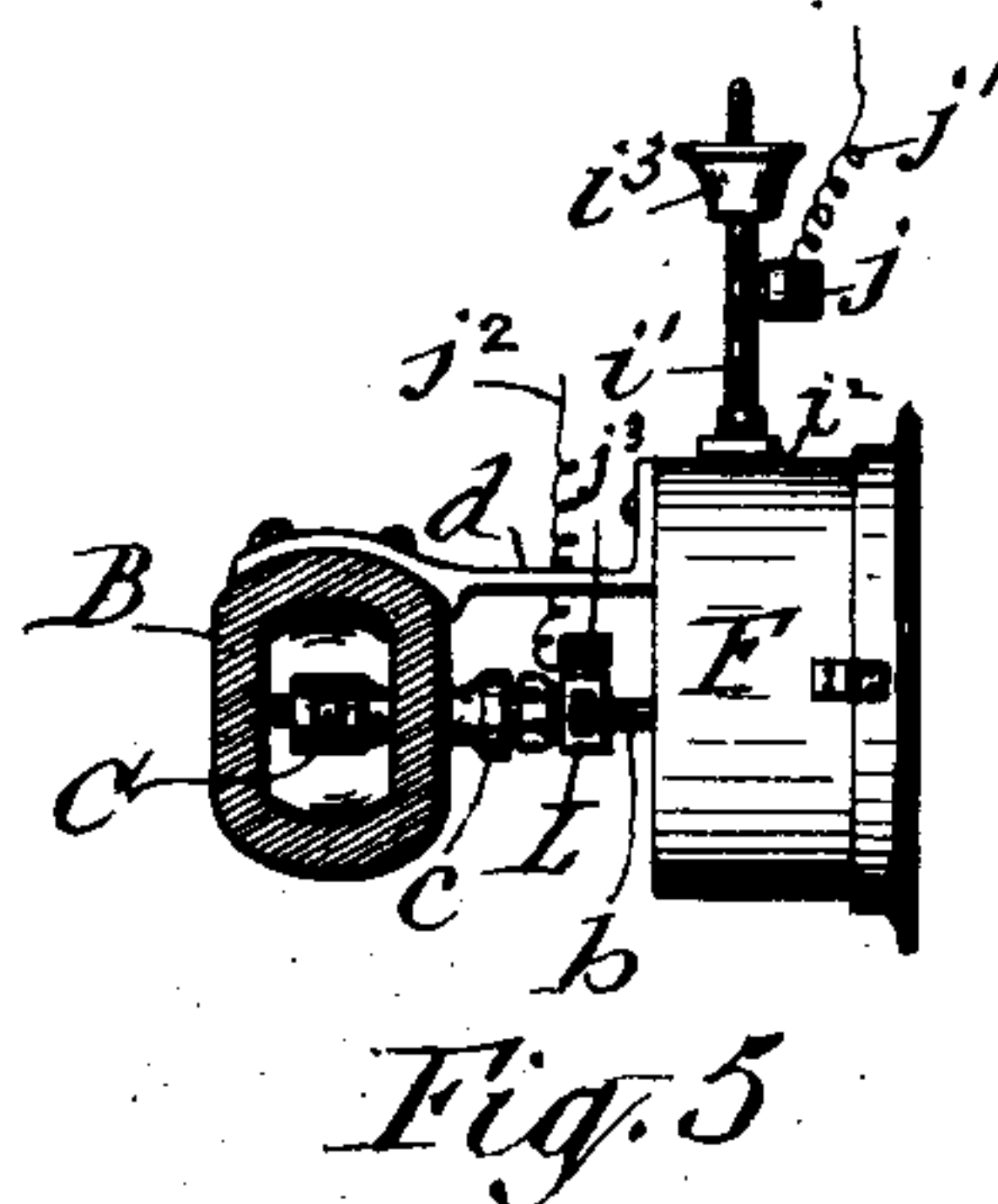
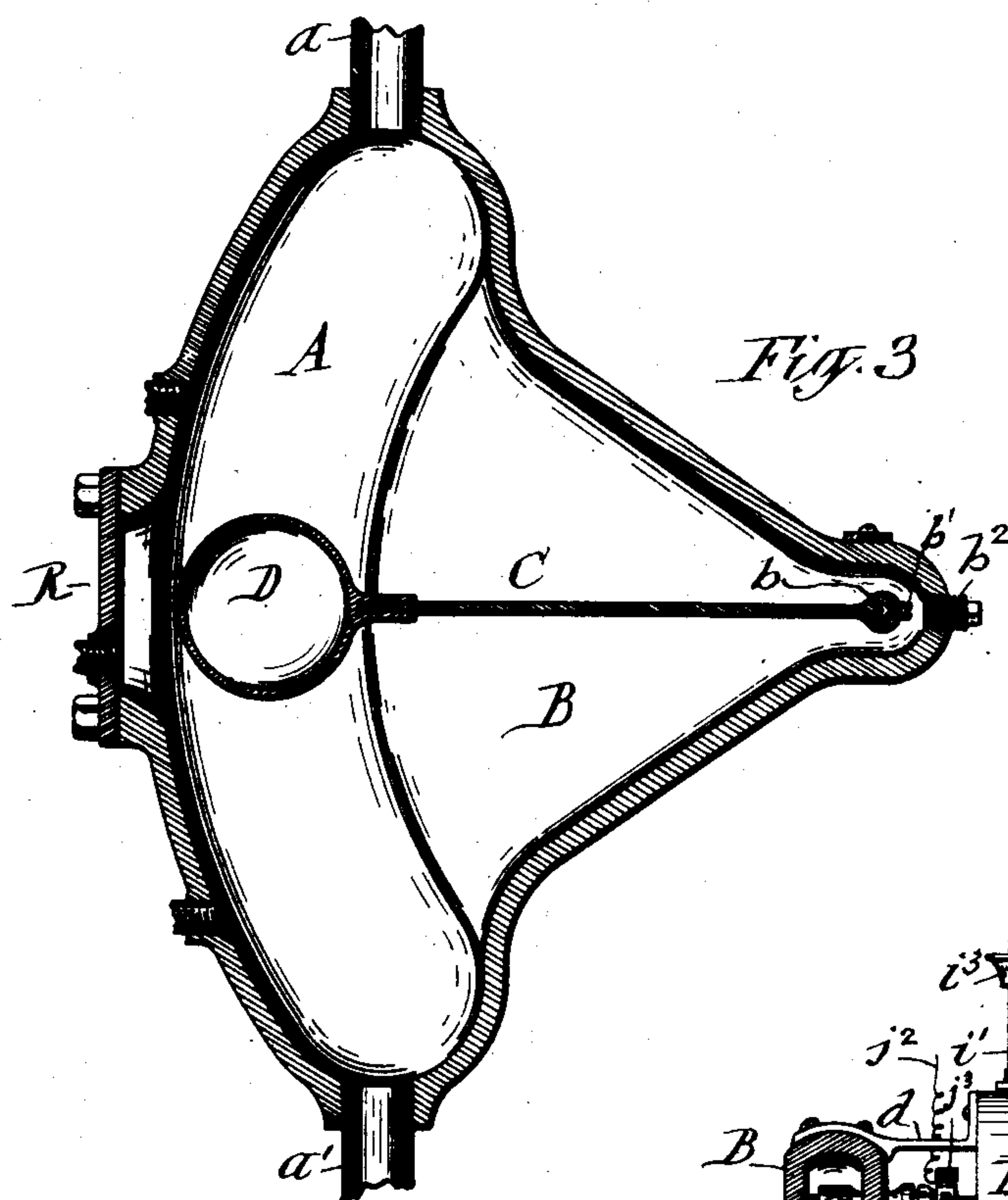
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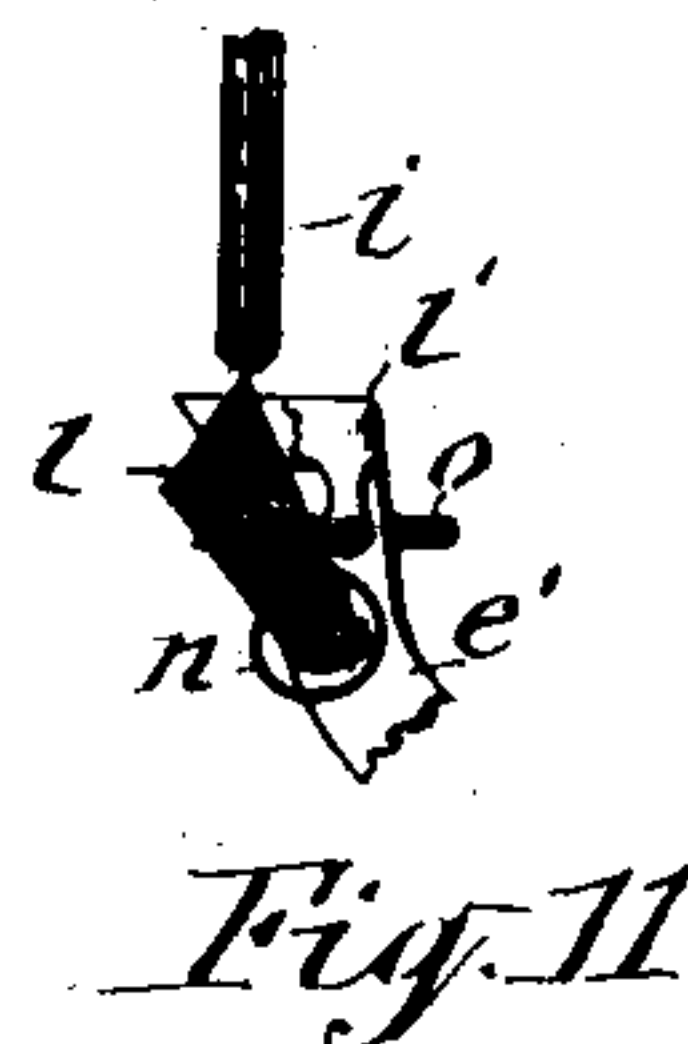
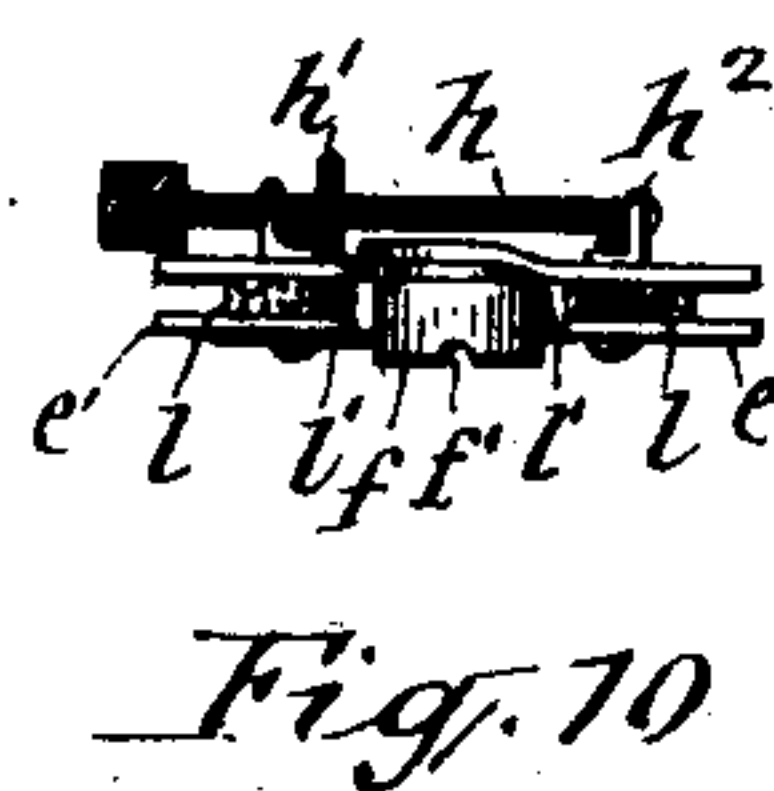
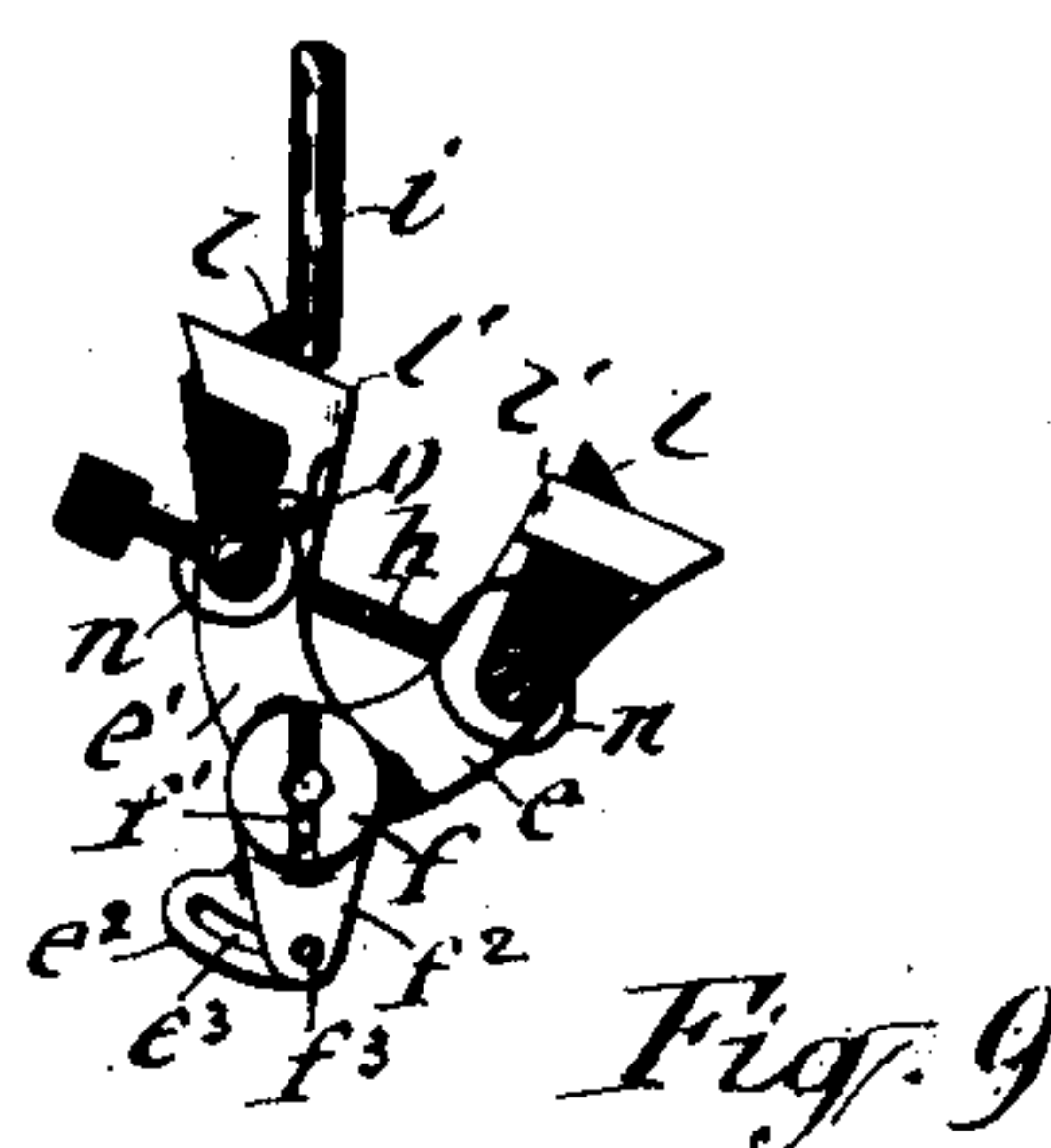
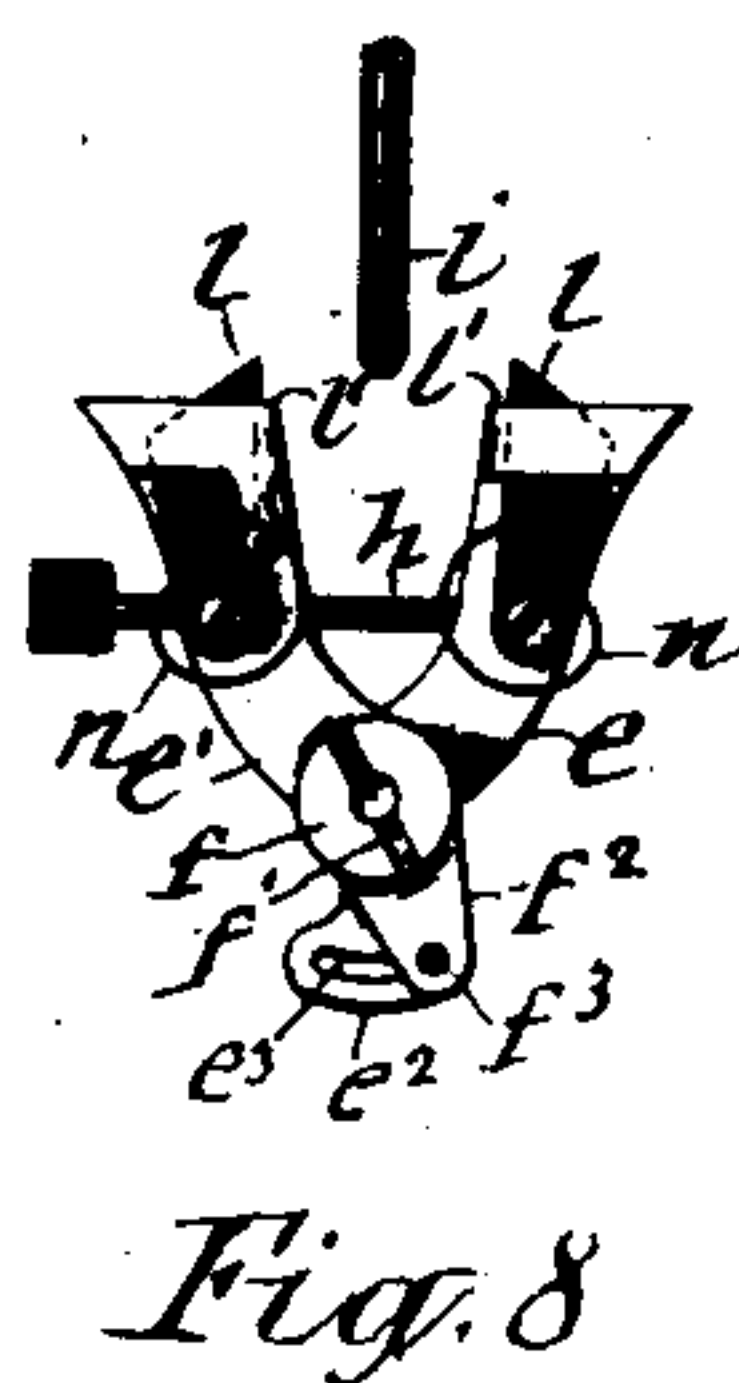
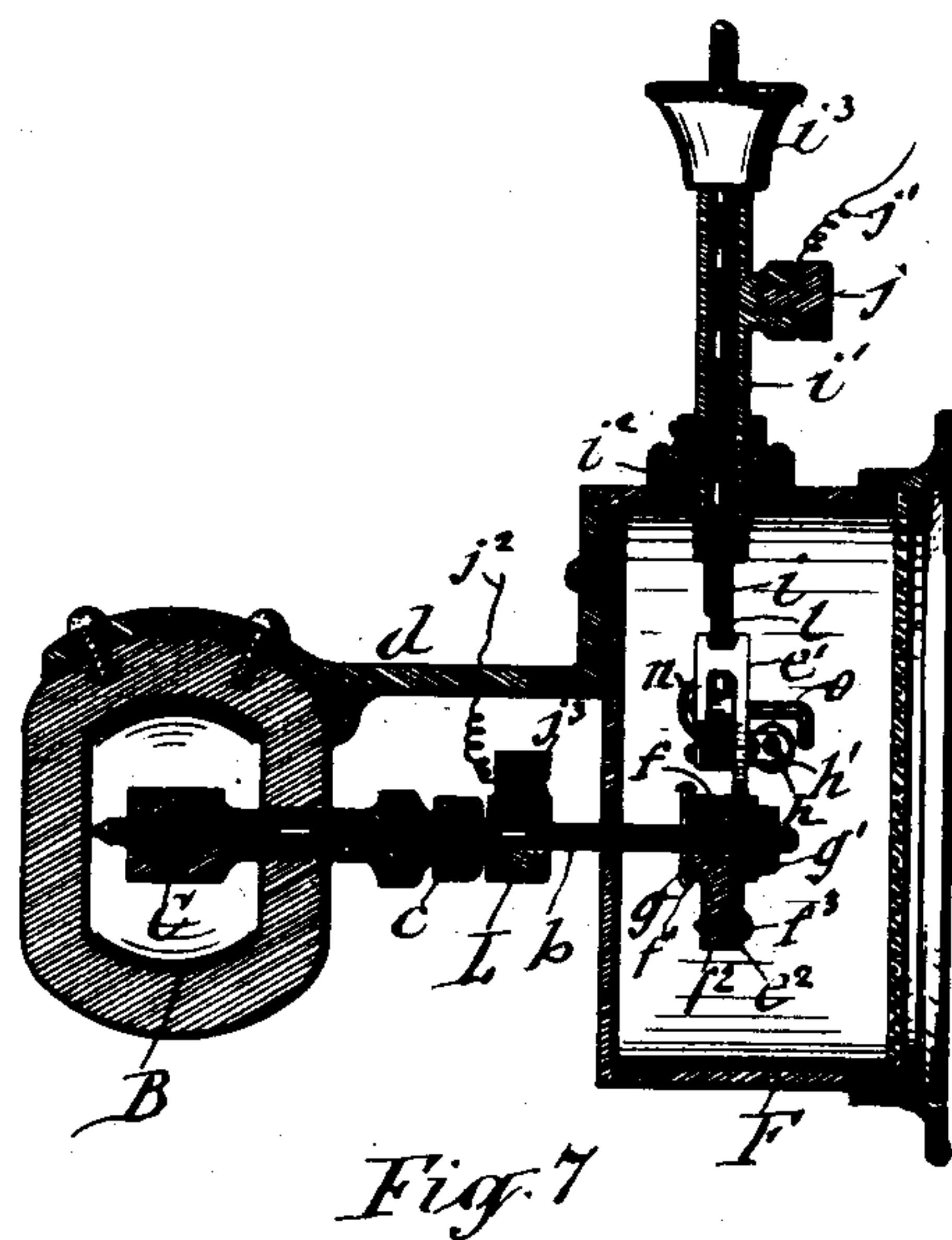
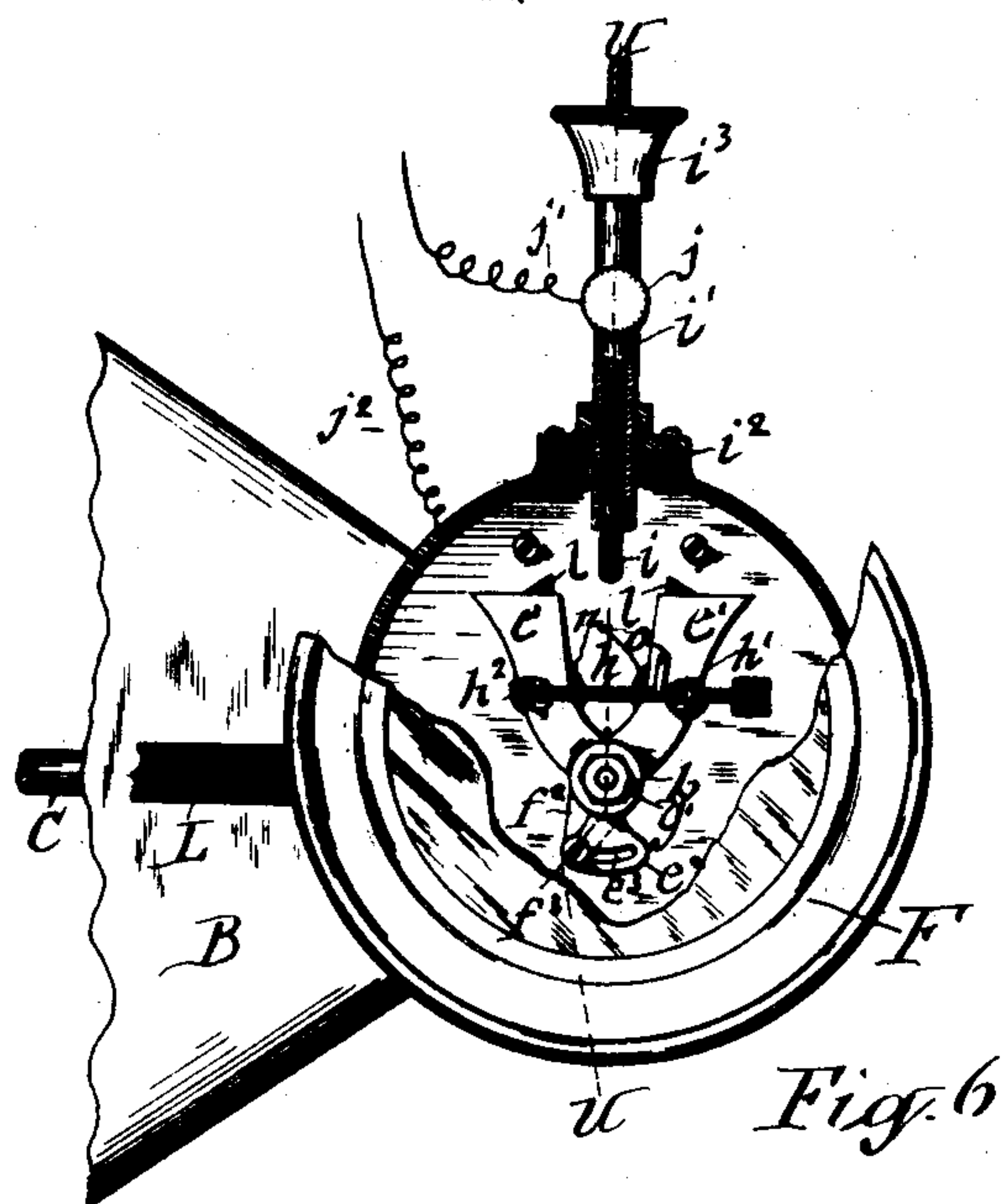
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(No Model.)

3 Sheets—Sheet 3.



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# UNITED STATES PATENT OFFICE.

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## HIGH OR LOW WATER ALARM.

SPECIFICATION forming part of Letters Patent No. 712,630, dated November 4, 1902.

Application filed December 5, 1901. Serial No. 84,731. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. ZIMMERMANN, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in High or Low Water Alarms, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of high and low water alarms which are arranged outside of the boiler or tank and communicate with the interior thereof to be actuated by the rise and fall of the water therein, and the invention has more particularly reference to the species shown in my Letters Patent No. 678,925, dated July 23, 1901.

The object of my present invention is to simplify the construction of the high and low water alarm and at the same time render it more efficient and reliable in its operation; and to that end the invention consists in the improved construction and combination of its component parts, as hereinafter described, and shown in the annexed drawings, in which—

Figure 1 is a face view of my improved high and low water alarm. Fig. 2 is a top view of the same. Fig. 3 is a vertical section on line X X in Fig. 2. Fig. 4 is a horizontal section on line Y Y in Fig. 1. Fig. 5 is a vertical transverse section on line Z Z in Fig. 2. Fig. 6 is an enlarged rear face view of the circuit making and breaking devices. Fig. 7 is a vertical transverse section on line U U in Fig. 6. Figs. 8 and 9 are detached rear face views of said devices shown in different operative positions. Fig. 10 is a top plan view of the same, and Fig. 11 is a detail view of the detent employed for locking out of normal position the insulator of one of the circuit making and breaking limbs.

Similar letters of reference indicate corresponding parts.

A represents a steam-tight chamber, which is disposed vertically at the exterior of the boiler or tank (not shown) and communicates with the interior thereof at points above and below the intended water-line by means of pipes *a a'*, attached, respectively, to the top and bottom of said chamber. This chamber is shaped segmental in the direction of its

height and has extending from its concave external side a casing or housing B, preferably formed integral with the chamber A and open to the interior thereof, as shown in Figs. 3 and 4 of the drawings. This housing is of the form of a sector which is concentric with the segmental chamber A. In the common center of said sector and segment is a shaft *b*, pivoted in the housing and protruding with one of its ends through the side thereof, as more clearly shown in Fig. 4. A stuffing-box *c*, attached to the housing and receiving through it the shaft *b*, serves to prevent escape of steam and water thereat.

Within the housing B is located an arm C, which is firmly secured at one end to the shaft *b* by means of a set-screw *b'*, which is accessible by the removal of a screw-threaded plug *b<sup>2</sup>*, applied to a hole in the end of the housing. The opposite end of the arm C has fastened to it the float D, which is thereby carried in a position to allow it to rise and fall in the chamber A. The segmental shape of said chamber allows the arm C to sustain the rising and falling float at a uniform distance from the pivot or shaft of the arm and to carry the float D in an arc central in the chamber A and concentric therewith. The float is thus guided solely by the arm C, which is allowed free oscillatory movement by the pivot of the shaft *b* and guides the float so as to carry it out of frictional contact with any part of the interior of the chamber A. This manner of guiding the float greatly facilitates its movement received from the rising and falling of the water in the boiler or tank.

To the free end of the housing B is attached a laterally-projecting bracket *d*, on which is firmly supported an annular case F, into which projects the shaft *b*. By attaching to the shaft *b* a pointer L, disposed to traverse a graduated scale N, the gradual upward and downward movement of the water in the boiler can be observed.

In the case F are two limbs *e e'*, consisting of metal plates carried on the protruding end of the shaft *b*. The limb *e* is adjustably confined in its position by means of a hub *f*, mounted on the shaft *b* and provided with a transverse groove *f'*, which engages a pin *g*, fastened in a hole drilled transversely through the shaft, as shown in Fig. 7 of the drawings.



A nut  $g'$  on the screw-threaded end of the shaft retains the hub engaged with the pin  $g$ . The hub  $f$  is formed with a downward extension  $f^2$ , which is provided with a screw-threaded eye. On the face of said hub extension lies a downward extension  $e^2$  of the limb  $e$ . This limb extension is provided with a transverse segmental slot  $e^3$ , and through this slot passes a clamping-screw  $f^3$ , which engages the aforesaid screw-threaded eye in the hub extension. Said slot allows the screw  $f^3$  to clamp the limb  $e$  in different positions on the hub  $f$ . The other limb is adjustably sustained in its position by means of a thumb-screw  $h$ , passing through a nut  $h'$ , attached to the limb  $e$  and pivoted to an ear  $h^2$ , attached to the limb  $e'$ . By turning the screw  $h$  the upper ends of the two limbs  $e e'$  can be set a greater or less distance apart for the purpose hereinafter explained. These limbs constitute two contact pieces or poles of an electric circuit, the generator or battery of which is shown at  $O$ , said circuit including an electric bell  $J$  or other suitable alarm.

Between the two poles  $e e'$  is arranged one of the electric terminals  $i$ , consisting of a metal rod passing longitudinally through a vertical metallic sleeve  $i'$ , which projects from the top of the case  $F$  and is fastened to it, with insulation  $i^2$  between them, as shown in Figs. 6 and 7 of the drawings. Said rod drops by gravity to a position to allow the lower end thereof to come in contact with the tops of the poles  $e e'$  when the latter are oscillated by the rocking of the shaft  $b$  occasioned by the rising and falling of the float  $D$ . A knob or other suitable stop fastened to the upper end of the rod  $i$  and coming in contact with the upper end of the sleeve  $i'$  serves to limit the descent of said rod, so as to normally sustain the lower end thereof in the aforesaid operative position in relation to the poles  $e e'$ . Said knob has a screw-threaded attachment to the rod, whereby the lower end of said rod can be adjusted to and from the path of the poles.

To the sleeve  $i'$  is attached a binding-post  $j$ , to which one end of the electric conducting-wire  $j^1$  is fastened. The other wire  $j^2$  of the circuit is fastened to a binding-post  $j^3$ , secured to the hub of the indicator  $L$ , by which hub said indicator is mounted on the shaft  $b$ .

The hereinbefore-described adjustment of the limbs or poles  $e e'$  regulates their times of contact with the terminal  $i$  according to the degree of the movement intended to be allowed to the float  $D$  in the case  $A$ . The pole  $e'$  is caused to make contact with the terminal  $i$  when the float descends from the proper water-level. The other pole  $e$  is caused to make the aforesaid contact when the float ascends from the water-level. Each of said contacts closes the circuit, and thereby causes the bell  $J$  to sound the alarm.

In order to give to the person in charge of the boiler or tank a more efficient warning of the dangerous condition of the water in said

boiler or tank, I elongate the contacting faces of the poles  $e e'$  and provide each of said faces with an insulating-plate  $l$ , pivoted at its lower end to the limb or pole and formed with an inclined upper end and held yieldingly at rest on a stop  $l'$  on said limb by means of a suitable spring  $n$  in a manner similar to that shown in my Letters Patent No. 678,925, of July 23, 1901.

In the operation of the described high and low water alarm the two poles  $e e'$  are sustained out of contact with the terminal  $i$ , as shown in Figs. 1, 6, and 8 of the drawings, by the arm  $C$ , lifted by the float  $D$ , carried at the proper water-level of the boiler or tank. As soon as the water recedes below said level the correspondingly-descending float causes the arm  $C$  to turn the shaft  $b$ , which moves the pole  $e'$ , and after a partial descent of the float said pole is brought in contact with the terminal  $i$ , and thereby causes the bell  $J$  to sound an alarm. In this movement of the pole  $e'$  the inner edge of the insulating-plate  $l$  is made to bear against the terminal  $i$  and is allowed by the spring  $n$  to be held by the terminal, as shown in Fig. 9 of the drawings. The person in charge then lifts the terminal  $i$  to stop the sounding of the alarm and allows the spring  $n$  to throw the insulating-plate  $l$  back to its normal position on the pole or limb  $e'$ . Then by releasing the terminal the same drops by gravity so as to rest upon the upper edge of said insulating-plate, whereby the circuit is maintained temporarily broken. The person in charge then sets the water-supplying pump in operation, thus causing the water to rise in the boiler and the float to ascend, which turns the shaft in the opposite direction, whereby the pole  $e'$  is thrown entirely from under the terminal  $i$ . If said person neglects to lift the terminal  $i$  to allow the insulating-plate  $l$  to become interposed between the terminal and pole  $e'$ , as before stated, said terminal will remain in contact with said pole, and thus cause the alarm to sound continuously or until the pump is operated or the circuit broken by means of the switch  $s$ . In case of inability to supply the boiler or tank with water through failure in the operation of the pump or other reason after the person in charge has lifted the terminal  $i$ , the continued movement of the pole  $e'$  will carry the insulating-plate  $l$  from under the terminal and allow said terminal to drop automatically onto the pole, and thereby cause the bell  $J$  to sound a second alarm. The same effect is produced by the other pole  $e$  when the water rises above its proper water-level in the boiler or tank. To allow the person in charge to arrest the sounding of the alarm when the boiler or tank is empty, I provide a detent or latch  $o$ , pivoted to the limb or pole  $e'$  and shaped to engage a notch  $t$  in the insulating-plate  $l$ , which the attendant pushes back to a position to support the terminal  $i$  upon said plate, and thus out of contact with the pole  $e'$ , as represented in Fig.



11 of the drawings. In the operation of filling the boiler or tank the resultant turning of the shaft *b* causes the locked insulating-plate *l* to slip from under the terminal *i*, which  
 5 then drops onto the pole *e'*, and thereby causes the bell *J* to sound an alarm. If the attendant desires to arrest the sounding of the alarm during said process of charging the boiler or tank, he can readily do so by turning the switch *s* to break the circuit. As soon  
 10 as the indicator shows that the boiler or tank is filled to the proper water-level the attendant is to turn the switch *s* to close the circuit, and thus cause the alarm to be controlled  
 15 automatically by the movement of the float *D*, and he is to also unlock the insulating-plate *l* by means of the aforesaid detent or latch *o*.

*p p p* denote trial-cocks attached to the  
 20 chamber *A* for the purpose of testing its communication with the boiler or tank.

*V* represents a water-glass of the usual and well-known style and applied to the chamber *A* for a further test of the operation of the  
 25 apparatus.

What I claim as my invention is—

1. The combination with the float-guiding arm and pivoted shaft attached to said arm, of two electric poles fastened to said shaft, a  
 30 movable electric terminal disposed to drop by its gravity into the paths of said poles, and an electric alarm in circuit with said terminal and poles as set forth.

2. The combination with the float-guiding arm and pivoted shaft attached directly to said arm, of two electric poles fastened to said shaft, a metallic sleeve sustained vertically over said poles, a metallic rod sliding in said sleeve, a stop on the rod limiting the move-  
 40 ment to the path of the aforesaid poles, electric conductors connecting said poles and sleeve with the electric circuit, and an electric alarm in said circuit as set forth.

3. The combination with the float-guiding

arm and pivoted shaft affixed to said arm, of 45 a hub sustained rigidly on said shaft and provided with a downward extension, an electric pole mounted on the shaft and clamped adjustably on the extension of said hub, a secondary electric pole mounted on the shaft, a 50 thumb-screw adjustably connecting the latter pole to the aforesaid clamped pole, an electric terminal disposed in the paths of said poles, and an electric alarm in circuit with said poles and terminal as set forth. 55

4. The combination with the float-guiding arm and pivoted shaft affixed to said arm, of an electric pole receiving motion from said shaft, an electric terminal disposed in the path of said pole and yieldingly to its con- 60 tact therewith, an insulating-plate sustained on the pole movably to a position to prevent contact of the terminal with the pole, a detent connected to the pole adjustably to lock the insulating-plate in the aforesaid position, 65 and an electric alarm in circuit with said terminal as set forth.

5. The combination with the boiler or tank, of a vertically-disposed chamber communicating with the boiler or tank above and below the water-line thereof, a float in said chamber, an arm attached to said float, a pivoted shaft fixed to said arm, two electric poles mounted on the shaft to partake motion therefrom, an electric terminal disposed in the 75 paths of said poles and yieldingly to its contact therewith, an insulating-plate sustained on one of the poles movably to a position to prevent contact of the terminal with the pole, a detent connected to said pole adjustably to 80 lock the insulating-plate in the aforesaid position, an electric alarm in circuit with said terminal and poles, and an indicator attached to the aforesaid shaft as set forth and shown.

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Witnesses:

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