

(No Model.)

A. M. RITCHIE.
GALVANOMETER.

No. 437,868.

Patented Oct. 7, 1890.

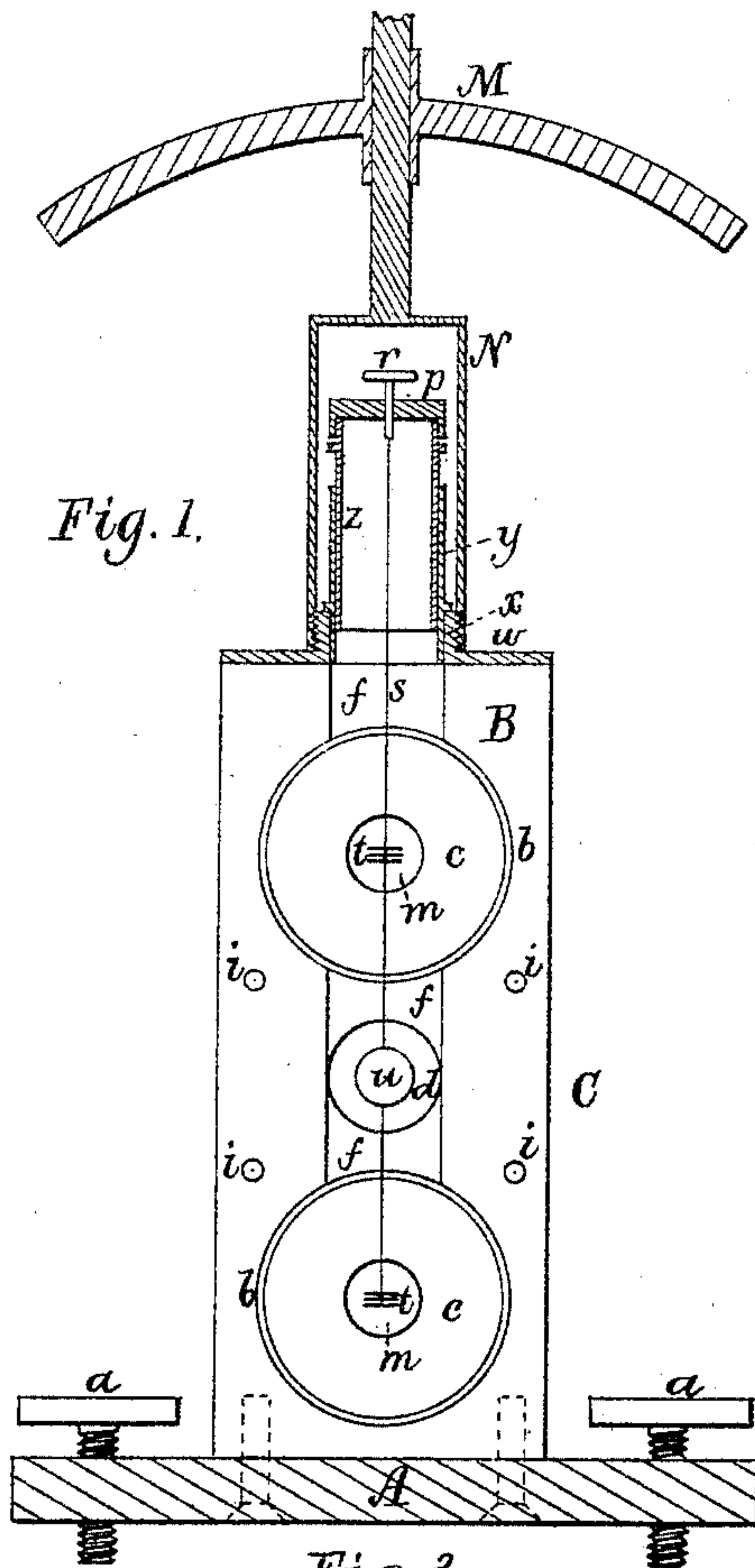


Fig. 1.

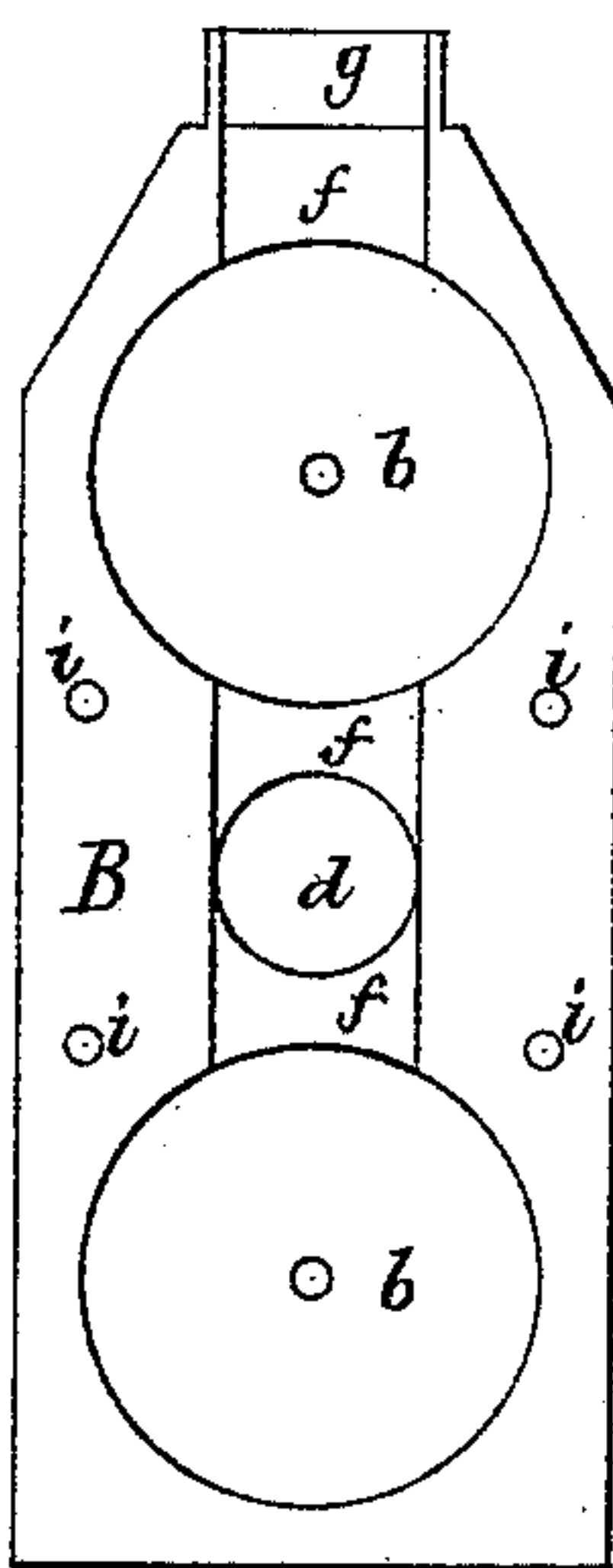


Fig. 6.

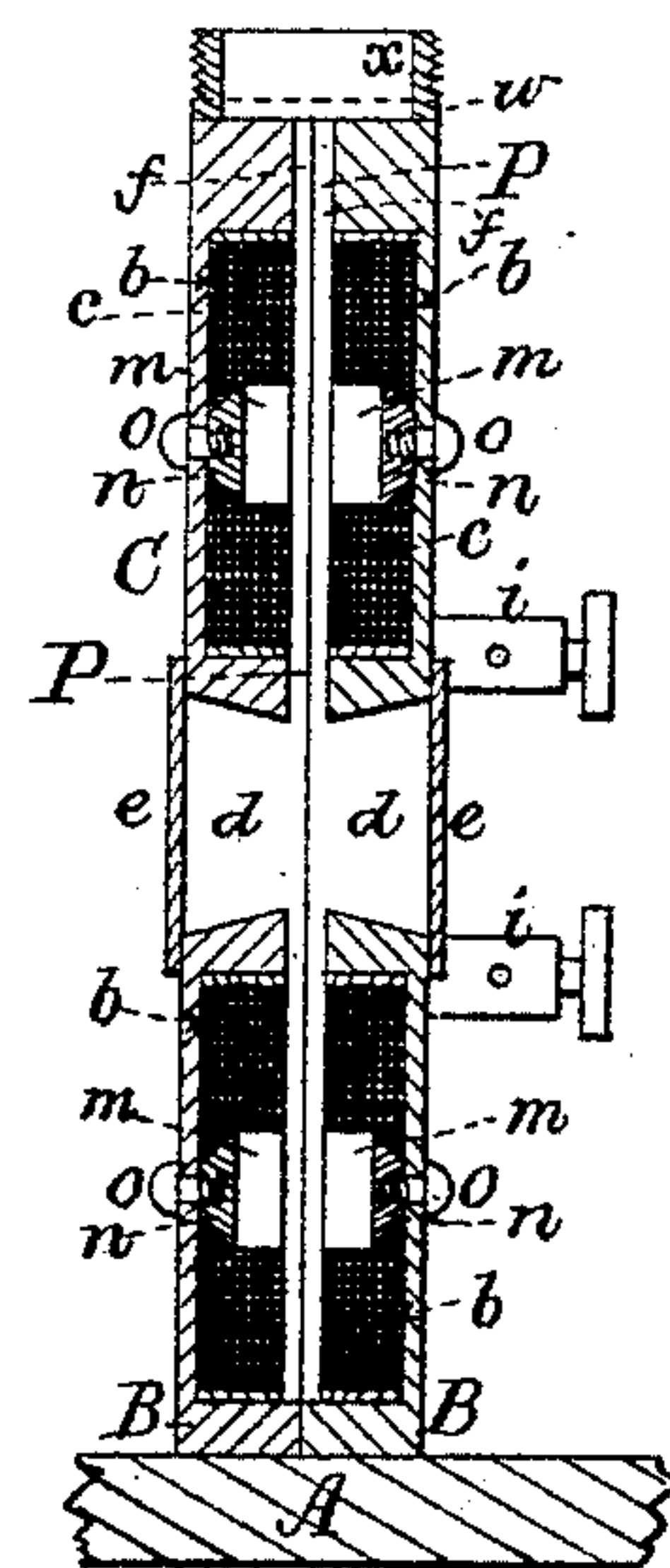


Fig. 2.

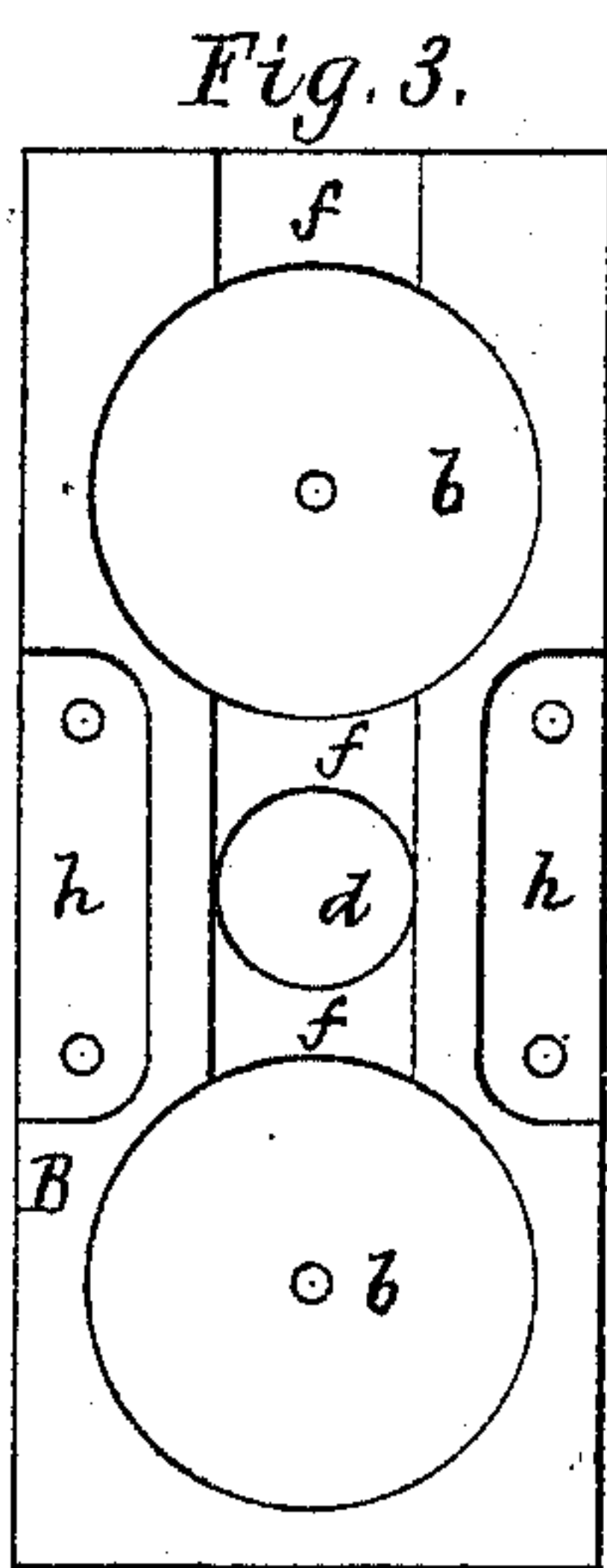


Fig. 3.

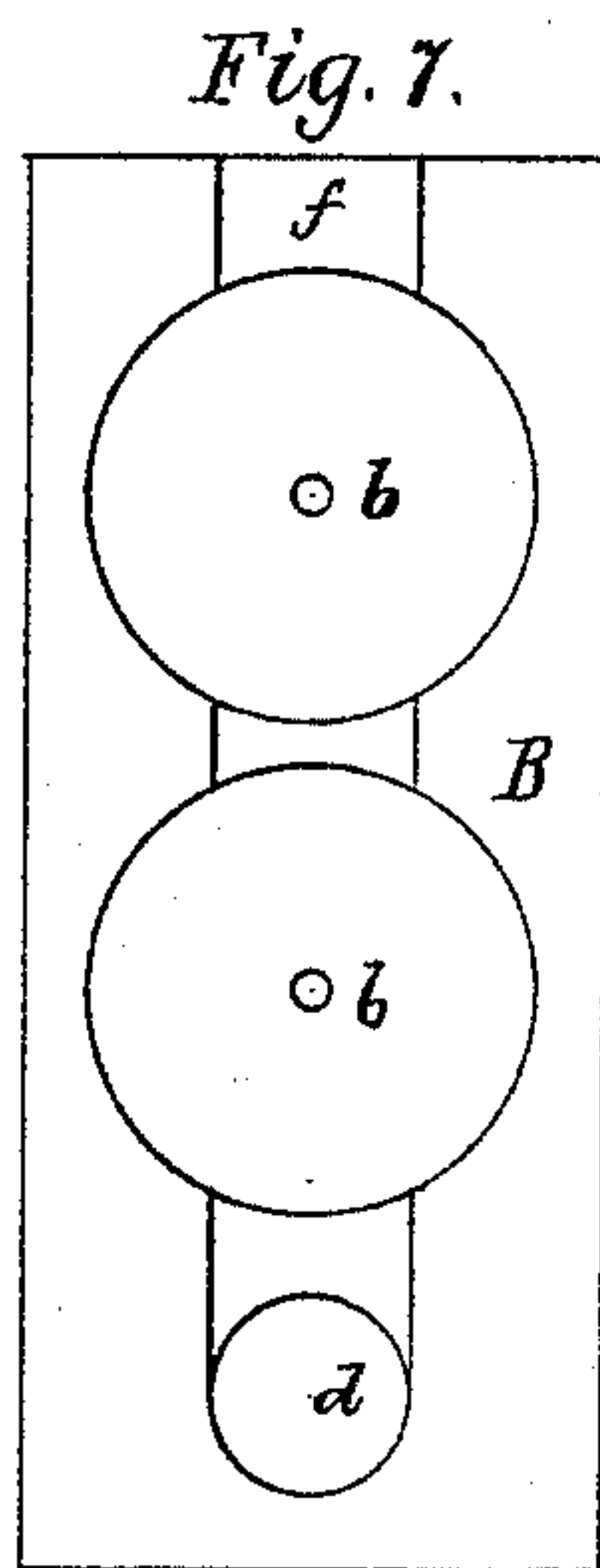


Fig. 7.

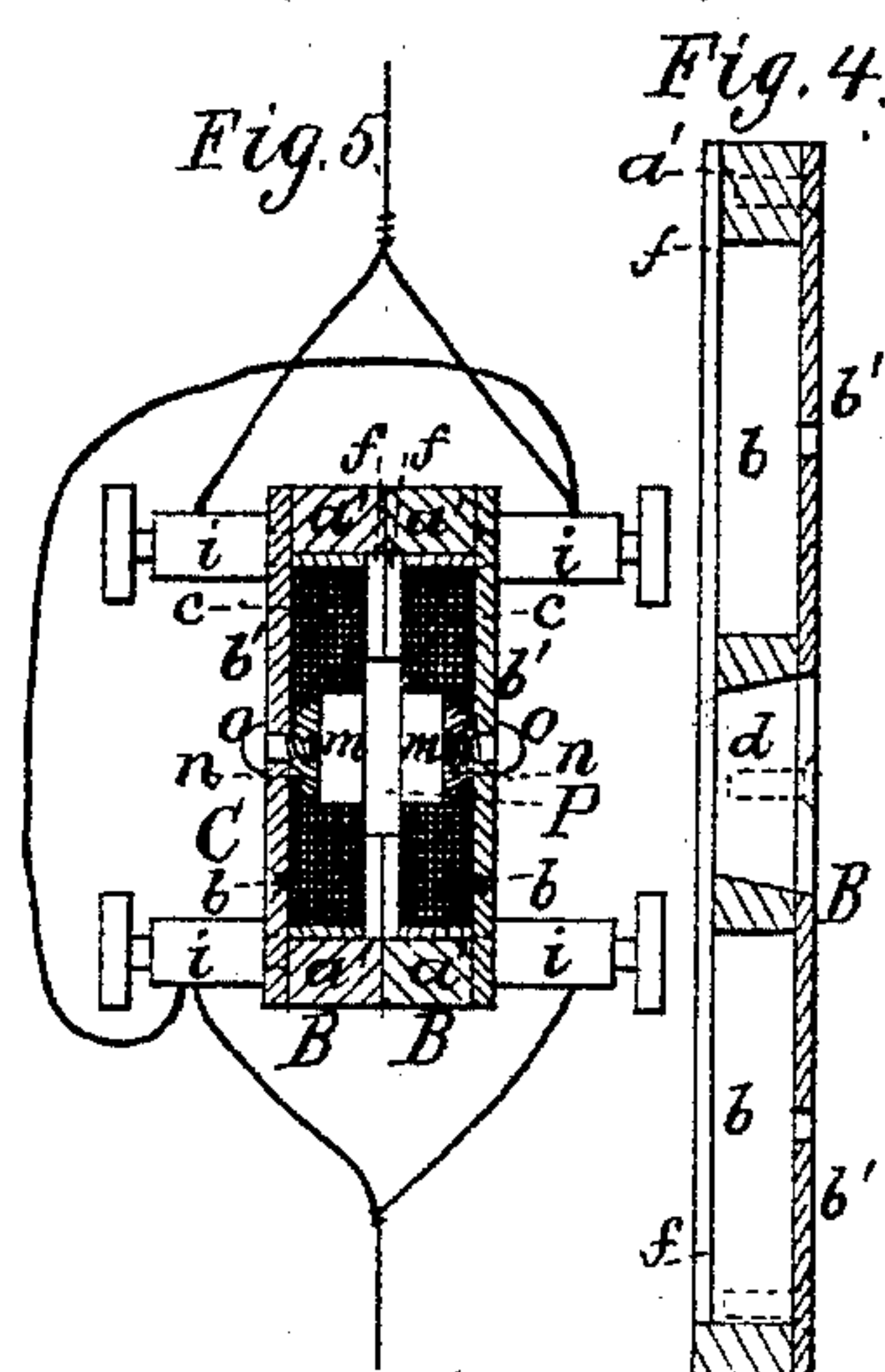


Fig. 4.

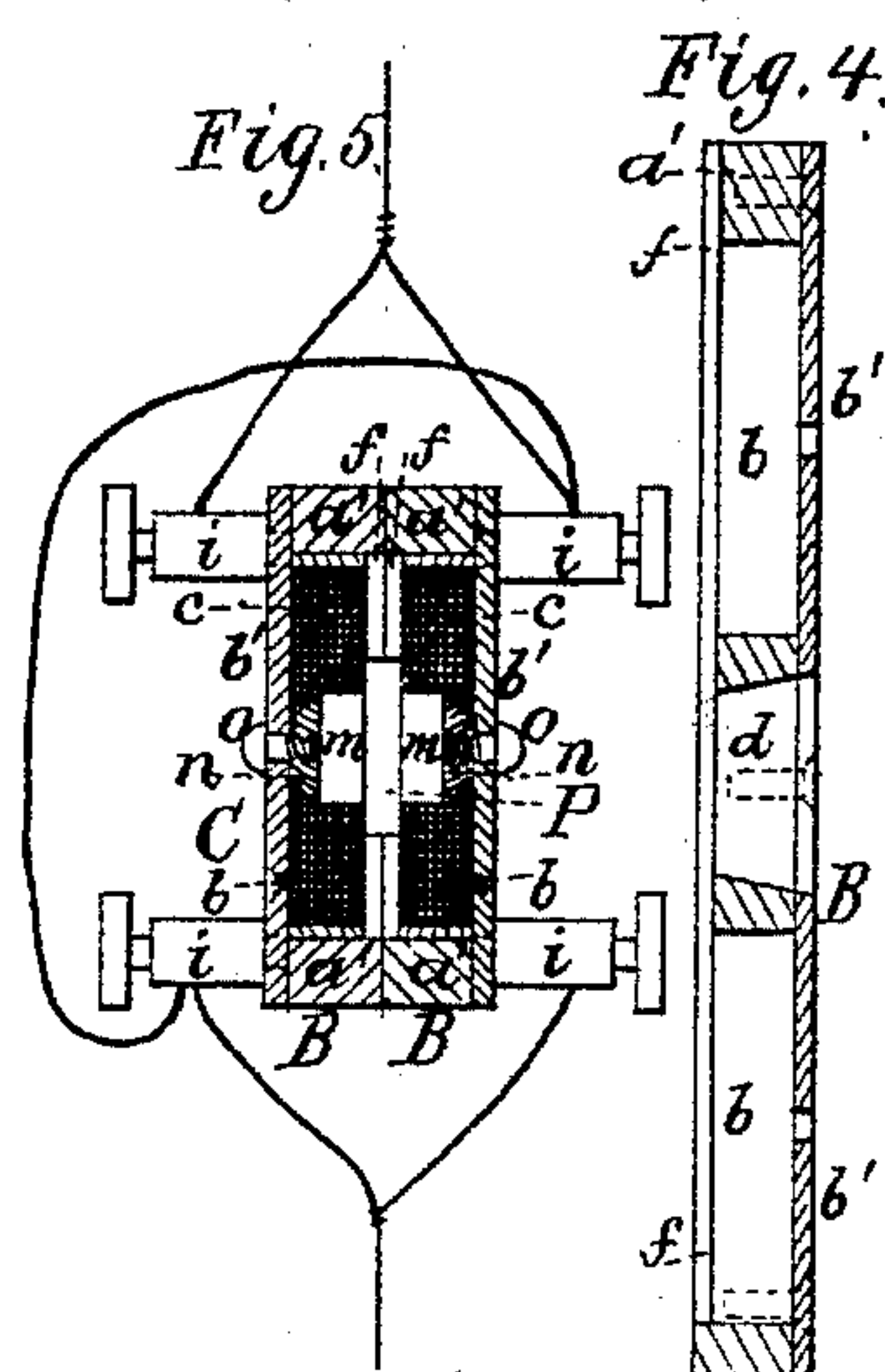


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

ANDREW M. RITCHIE, OF BROOKLINE, MASSACHUSETTS.

GALVANOMETER.

SPECIFICATION forming part of Letters Patent No. 437,868, dated October 7, 1890.

Application filed February 18, 1890. Serial No. 340,884. (No model.)

To all whom it may concern:

Be it known that I, ANDREW M. RITCHIE, a citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Galvanometers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The improvements hereinafter described relate to the galvanometer for which Letters Patent of the United States of America, No. 413,812, were granted to me on the 29th day of October, 1889, the object of said improvements being for the purpose of simplifying and cheapening the construction of the instrument; also for facilitating the adjustment of the fiber to which the needles and mirror are attached.

In carrying out my improvements I dispense with the case-supporting pillars B and brackets *h* (shown in Fig. 1 of the drawings of said patent) and secure the said case directly to the base; also in some cases I do without the recesses *h* and incline *f'*. Furthermore, the instrument is provided with means for adjusting the needle system, additional to the sliding pin *r*, and sometimes the parts or halves of the case C are each formed of more than one piece of material.

The nature of my improvements is defined in the claims hereinafter presented.

Figure 1 is an interior view of one half of the case of the instrument, the base and the cap and the magnet and fiber-supports being shown in vertical and median sections as applied thereto. Fig. 2 is a vertical and median section of the case, taken in a plane at right angles to that of Fig. 1. Fig. 3 is an interior view of one of the half-sections of the case, and Fig. 4 a vertical and median section of the same. Fig. 5 is a horizontal section of the case, taken through one set of the coil-chambers, and the coils therein. Fig. 6 is an interior view of one of the case-sections,

formed as shown in the drawings of the patent hereinbefore referred to, excepting that it is unprovided with the recesses *h* and incline *f'*. Fig. 7 represents a modification in the arrangement of the cavities *b* and hole *d* in the parts of the case.

In said drawings, A denotes the base of the instrument, provided with leveling-screws *a a* and C, the case erected thereupon composed of two parts B B, each part made of one piece of material, as shown in Fig. 2, or of pieces *a'* and *b'* secured together, as seen in Figs. 4 and 5. When said parts B are made in two pieces, the piece *a'* is usually a thin plate of vulcanite, formed with an opening through it at or near its middle, and the piece *b'*, which is a plate of greater thickness than *a'*, is also provided with an opening through it at or near its middle, and with other openings *b*, and when the said plates are secured to each other, screws being usually employed to unite them, (see dotted lines in Fig. 4,) the first-mentioned opening in the plate *b'* coincides with that in the plate *a'*, and together form a hole *d*.

Each part B, whether made of one or more pieces of material, is formed with cylindrical cavities *b b*, a hole *d* extending through it for the admission of light, and a rabbet *f*, connecting said cavities and hole and opening through the top of said parts, as shown. Glass plates *e e*, applied to the outside of the case, cover the holes *d d*. A wire coil *c* is arranged in each cavity *b*, the thickness of said coil being less than the depth of said cavity, the face of said coil being in line with the face of the said rabbet. The coils *c* are wound in the usual manner of insulated wire, and are provided with a cylindro-conical central aperture *m*, the cylindrical part of which furnishes space for the needle to swing, and the conical part serves as a bearing for the vulcanite plug *n*, into which a screw *o* is screwed to confine the coil in position.

I prefer to fill the annular space around each coil *c* with paraffine, so that when the parts B B are closed together there will be no obstruction in the passage P, formed by the two rabbets, to interfere with the lowering of the system of needles into the case, said sys-

tem being composed of the magnetic needles *t t* and reflecting-mirror *u*, attached to a fiber *s*, as represented.

To facilitate connecting the wires of the coils to each other and to the pole-cups *i i*, recesses *h h* are formed in the inner face of each half *B* of the case, and said wires are left sufficiently slack to admit of the parts *B B* being opened as if they were hinged together, and without endangering the connections, or the connections can be made to pole-cups on the same side of the instrument as the coils, which admit of the removal of the parts *B B* from each other. (See Fig. 5.)

To the top of the case *C*, when its parts *B B* are closed together and each part is unprovided with the semi-cylindrical cavity *g*, communicating with the rabbet, as shown in Fig. 6, there is applied a plate *w*, having a neck *x*, screw-threaded on its exterior to connect with standard *N*, supporting the magnet *M*, and into the bore of said neck a tube *y* is inserted, within which is placed a tube *z*, having the cap *p* at its top, in which is the sliding pin *r* for sustaining the fiber *s*. The tube *z* bears with the requisite friction against the interior of the tube *y* to hold it in position.

The cavities *b* and hole *d* may be located in the parts *B*, as shown in Fig. 7, if desired.

What I claim is—

1. In a galvanometer, the case made in two

parts, each part formed of two or more pieces of material and provided with one or more coil-receiving cavities, a light-admitting hole, and a rabbet connecting said hole and cavity or cavities, as and for the purpose explained. 35

2. In a galvanometer, the combination of the parts *B B*, each provided with one or more coil-receiving cavities, a light-admitting hole, and a rabbet connecting said hole and cavity or cavities with the plate *w*, sustaining the magnet-supporting standard and the fiber-suspension tubes *y* and *z*, the cap of the latter, and the pin to which the fiber is attached, as and for the purpose explained. 40

3. In a galvanometer, the combination of the parts *B B*, each part formed of one or more pieces of material and provided with one or more coil-receiving cavities, a light-admitting hole, and a rabbet connecting said hole and cavity or cavities with the plate *w*, sustaining the magnet-supporting standard and the fiber-suspension tubes *y* and *z*, the cap of the latter tube, and the pin *r* movable therein, said pin sustaining the fiber *s*, as and for the purpose explained. 45

In testimony whereof I affix my signature in presence of two witnesses.

ANDREW M. RITCHIE.

Witnesses:

S. N. PIPER,

C. F. DANIELS.