

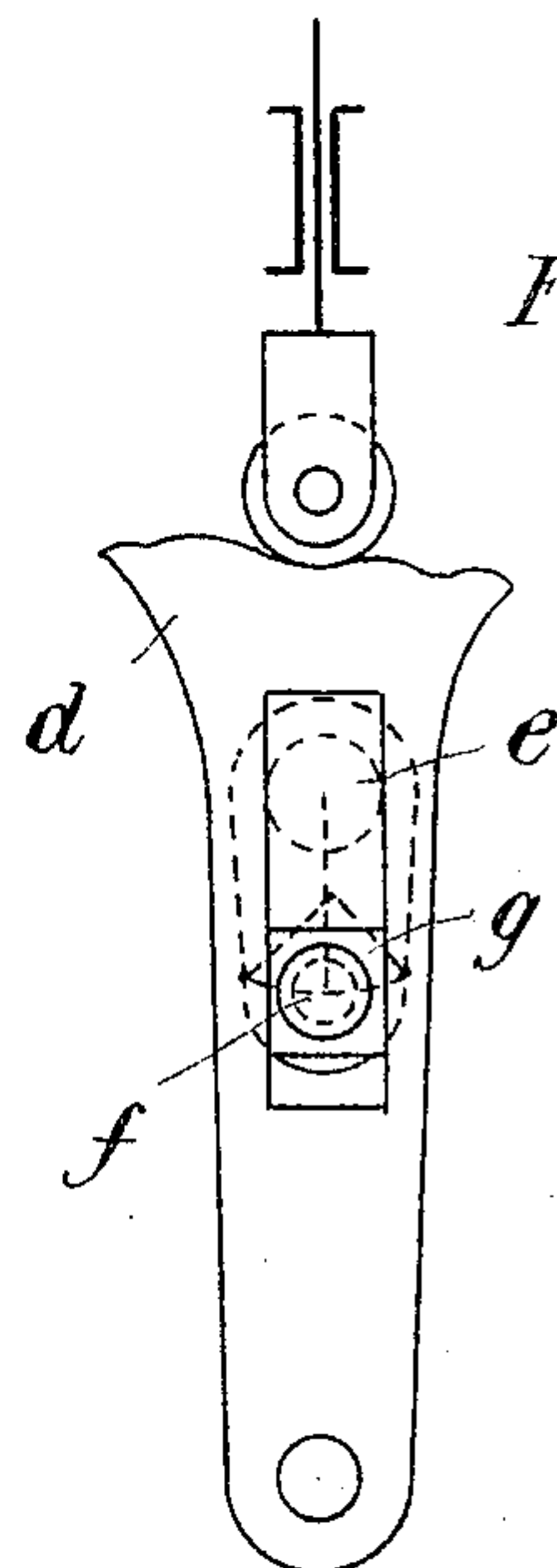
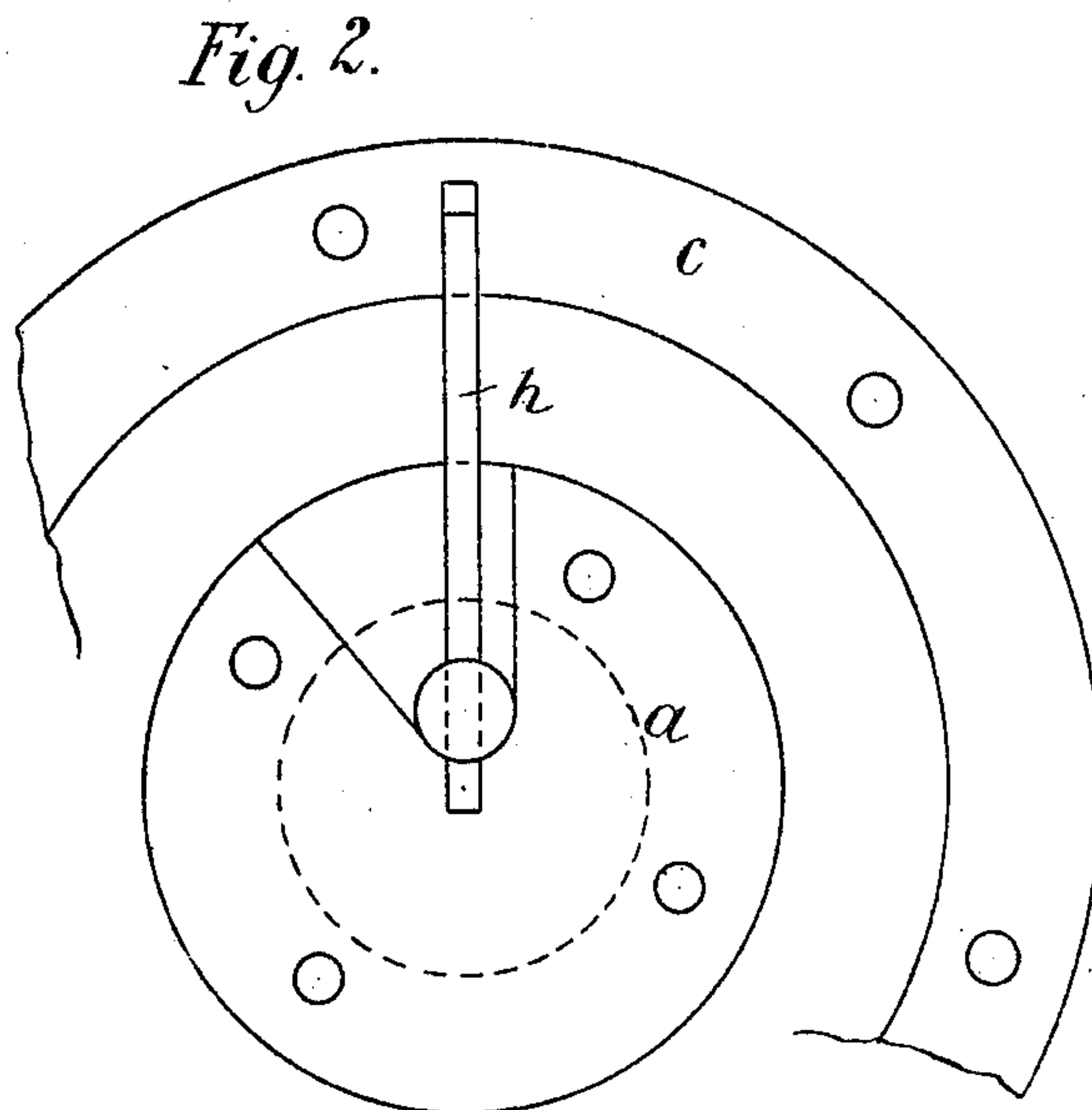
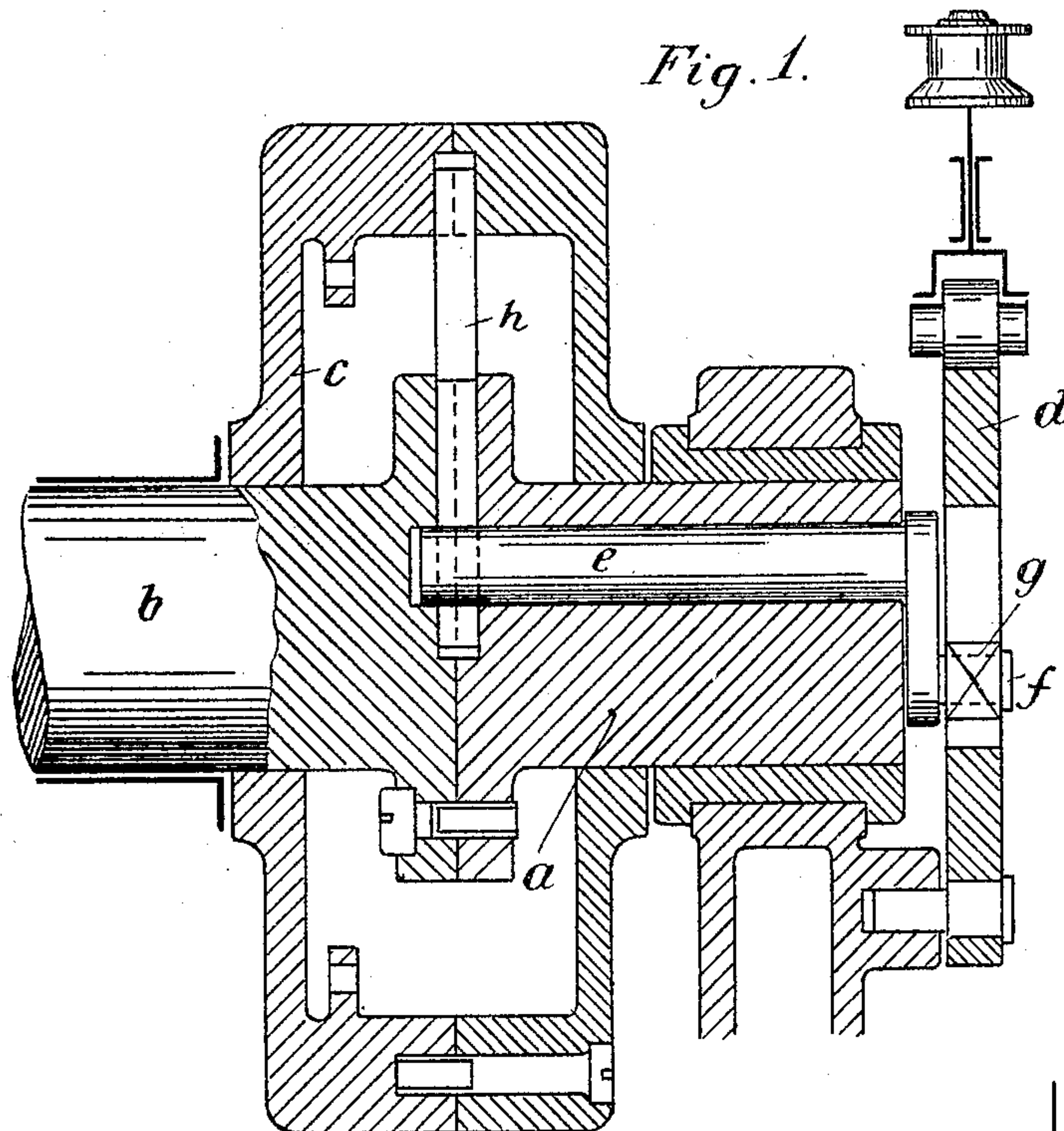
No. 798,425.

PATENTED AUG. 29, 1905.

H. LENTZ.  
VALVE GEAR.

APPLICATION FILED MAR. 31, 1905.

2 SHEETS—SHEET 1.



WITNESSES,  
*George G. Schoenlank*  
*W. H. Berrigan*

INVENTOR,  
HUGO LENTZ,  
BY *Ivan Olden*  
HIS ATTORNEY.

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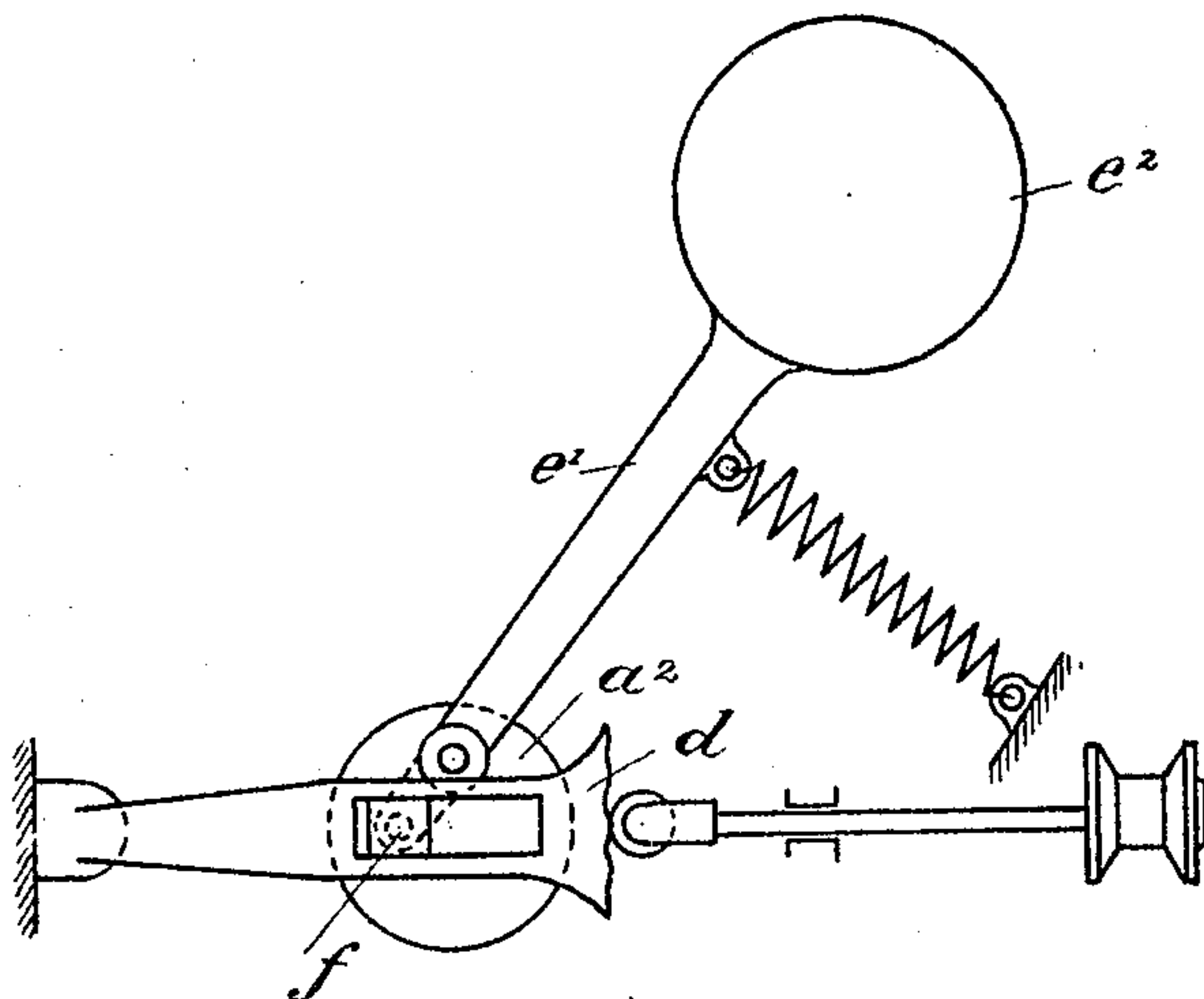
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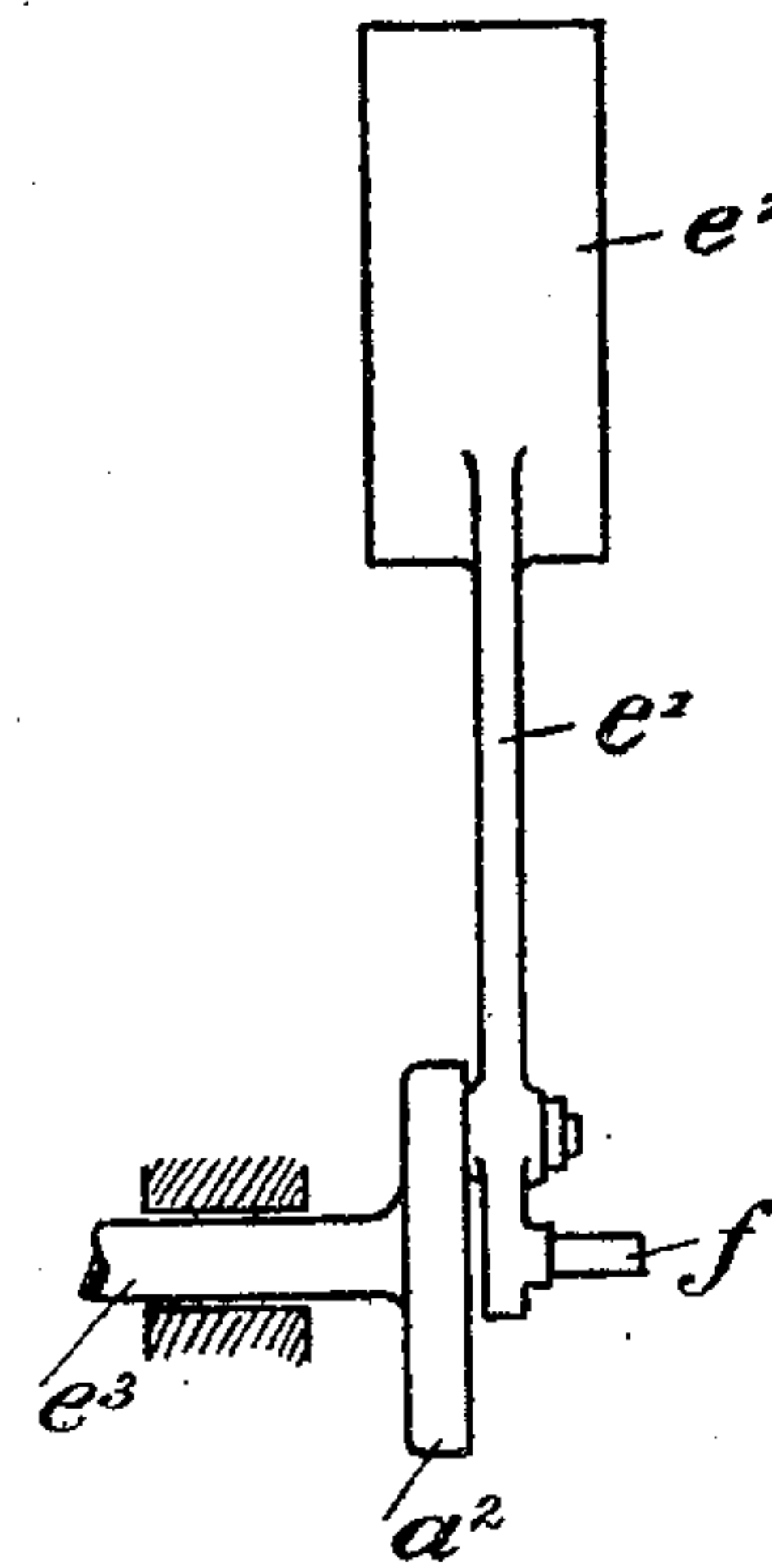
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2 SHEETS—SHEET 2.

*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

HUGO LENTZ, OF BERLIN, GERMANY.

## VALVE-GEAR.

No. 798,425.

Specification of Letters Patent.

Patented Aug. 29, 1905.

Application filed March 31, 1905. Serial No. 253,110.

*To all whom it may concern:*

Be it known that I, HUGO LENTZ, a subject of the German Emperor, residing at 10/11 Potsdamerstrasse, Berlin, Germany, have invented a new and useful Improvement in Oscillating Valve-Gears; and I do hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to oscillating valve-gears, and has for its object the providing of simple and efficient means for governing the oscillating valve-plate or cam-disk or other part of the valve.

Prior to my invention governing devices for oscillating valve-gears have included complicated intermediate connections between the governor and the oscillating valve-plate. Many such forms have been proposed and tried. One form of governing device for this purpose is described and shown in British Patent No. 10,713 of 1891.

My improved structure dispenses with the complex intermediate connections referred to, and I positively and directly connect the governor and valve-plate together for the purpose of varying the oscillations of the valve in accordance with the load on the machine.

The form of governing device preferably employed by me is shown in Figures 1, 2, and 3 of the accompanying drawings and employs a flat governor positively connected with a pin adapted to rock in a rotating part of the machine and carrying a crank-pin at the outer end and in sliding engagement with a valve-plate. Modifications thereof or other forms (such as that shown in Figs. 4 and 5) may be used in place of the illustrated structure.

Referring to the drawings, Fig. 1 is a sectional view of a shaft end with one embodiment of my invention applied thereto. Fig. 2 is an end view of the shaft extension, part of the governor, and bolt connecting the governor and crank-pin. Fig. 3 is a right end view showing the valve-plate, &c. Figs. 4 and 5 are respectively side and sectional views of a somewhat different structure which employs a pendulum in place of a flat governor.

Referring to Figs. 1 and 2, I have shown a governor-shaft which may consist of parts *a* and *b*, bolted together. The governor-shaft carries any suitable form of flat governor *c*, which may be, as shown, made of two assembled shells. At the extremity of the shaft I place a cam-disk *d* or other form of valve-plate, which actuates the valve-gear mechanism. The shaft end or,

more exactly, its extension *a* is bored eccentrically, and a spindle *e* is fitted therein to have a rocking motion. At its outer extremity said spindle carries a small crank with a pin *f* and a bearing-box *g*, which slidably fits a slot in the valve-plate or cam-disk *d*. The inner end of spindle *e* is slotted, and a bolt or lever *h* engages with said slot and with a slot formed in the governor *c*. In accordance with the load on the machine the governor *c*, through the bolt *h*, adjusts the spindle *e*, and the spindle, with the pin *f*, constitutes the adjustable regulating parts of the invention. The shaft (or its parts *a* and *b*) rotates with the machine, carrying the spindle *e* and pin *f*, and the latter oscillates the valve-plate or cam-disk *d*. Any adjustment of the regulator parts in consequence of variations of load upon the machine causes a shifting, however slight, of the spindle *e* and independently of its driving with the shaft extension *a*, and a change in the position of the pin *f*, varying its distance with respect to the center or axial line of the shaft extension. Obviously the extent of oscillation of the valve-plate or cam-disk *d* is varied in accordance with the position of the pin *f*.

The construction or combination shown in Figs. 1 to 3 has the advantages of cheapness in production, simplicity, compactness, precision and security of operation, and durability and ease of repair owing to the few and non-delicate parts subject to wear and strain.

As stated, the governor of the device shown in Figs. 1, 2, and 3 is adjusted in accordance with variations of the load upon the steam-engine, and such governor returns to original or normal position when the load again equals the original load. In other words, if the engine is heavily loaded the governor assumes a definite position, which we may call "A;" if the load is reduced—for instance, by cutting out several machines or engines—the governor assumes a different position, swinging farther and coming to a position which we may call "B;" if the machines or engines, which were cut out as before are again cut in the governor returns to the position A.

In the form of my invention shown in Figs. 4 and 5 the flat governor is replaced by a pendulum *e*<sup>2</sup>, acting as a governor, and which varies, as before described, the position of the pin *f* with respect to the center of the regulator-shaft *e*<sup>3</sup>, which corresponds to the shaft extension *a* of Fig. 1.



The pendulum  $e^2$  is pivoted on the regulator-shaft or shaft extension  $a^2$ , and the arm  $e'$  of such pendulum is connected by a spring, as shown, with a part carried by and moving with the rotating part  $a^2$ . The centrifugal momentum of the pendulum  $e^2$  is resisted or counteracted by the spring referred to. With an increase of speed of the shaft or shaft extension  $a^2$  the pendulum or weighted end  $e^2$  thereof swings outwardly and puts the spring under greater tension. As a result of the movements of the pendulum the pin  $f$  correspondingly moves its bearing-box toward and from the center of the regulator-shaft or shaft extension  $a^2$ , thus correspondingly varying the oscillations of the valve-plate or cam-disk  $d$ .

I desire it to be understood that my invention is not confined to the forms illustrated in the drawings accompanying this specification. Obviously other and equivalent forms will readily suggest themselves to persons skilled in this art.

What I claim is—

1. A governing device for oscillating valve-gears, comprising an oscillating valve-plate, a varying means therefor driven by a rotating part of the machine controlled and having motion independently of said part, and a governor, for said machine, directly connected with and giving said independent motion to the varying means.

2. A governing device for oscillating valve-gears, comprising an oscillating valve-plate, a pin for varying the motion thereof, said pin driven by a rotating part of the machine and having a motion independently thereof, and a governor, for said machine, connected with and giving said independent motion to the said pin.

3. A governing device for oscillating valve-gears, comprising an oscillating valve-plate, a pin for varying the motion thereof, said pin being eccentrically journaled in a rotating part of the machine, and a governor, for said machine, connected with and adapted to rock

the pin independently of the rotary motion given thereto.

4. A governing device for oscillating valve-gears, comprising an oscillating valve-plate, a varying means therefor comprising a crank-pin device operated by a rotating part of the machine, and a governor for said machine, directly connected with and giving independent motion to the varying means.

5. A governing device for oscillating valve-gears, comprising an oscillating valve-plate, a varying means therefor comprising an oscillating crank-pin device mounted in a rotating part of the machine, and one end of which slidably engages the valve-plate while the other end engages a bolt, and a governor surrounding the rotating part aforesaid, and having a loose connection with the said bolt.

6. A governing device for oscillating valve-gears, comprising an oscillating valve-plate, a varying means therefor driven by a rotating part of the machine controlled and movable to and from the center of said rotating part, and a governor, for said machine, directly operating upon the varying means to shift its position as aforesaid.

7. A governing device for oscillating valve-gears, comprising an oscillating valve-plate, a governor movably mounted upon a rotating part of the machine, and a part carried by said governor and having a slidable connection with the valve-plate.

8. A governing device for oscillating valve-gears, comprising a slotted oscillating valve-plate, a bearing-box movable within the slot, and a governor pivoted upon a rotating part of the machine and provided with a pin which fits the bearing-box aforesaid.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HUGO LENTZ.

Witnesses:

LUDWIG LICHTENSTEINER,  
KARL H. MERK.