

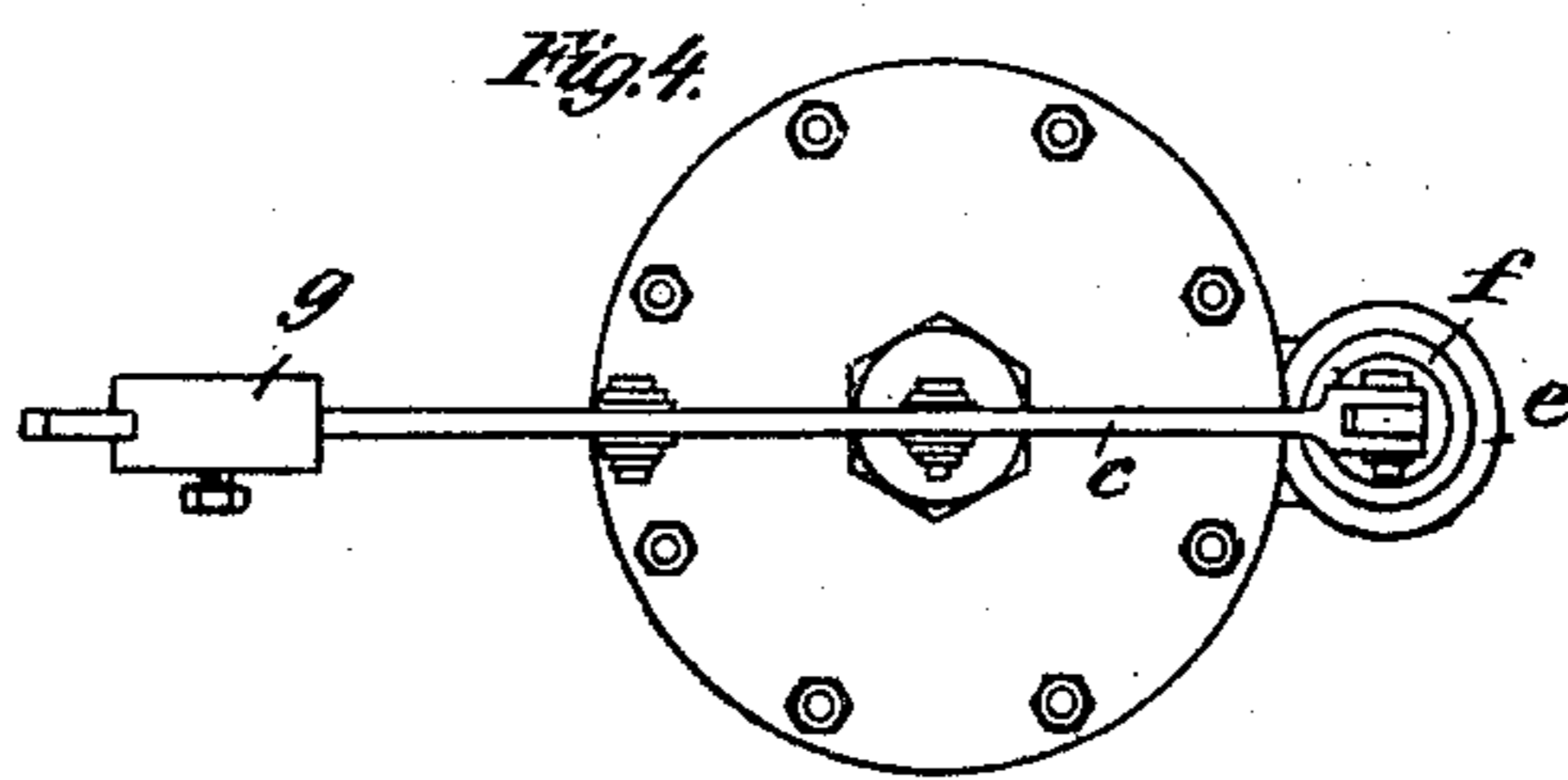
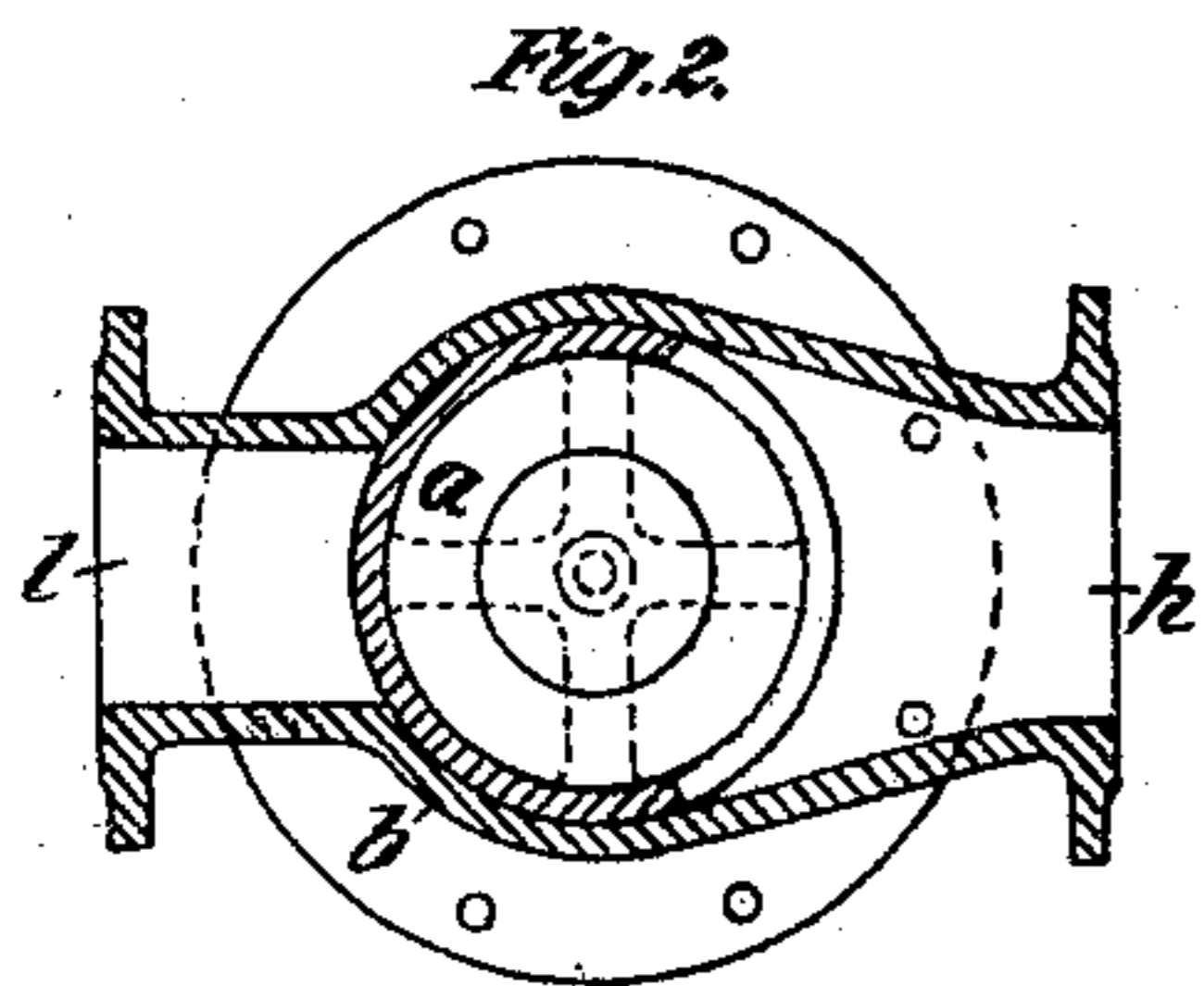
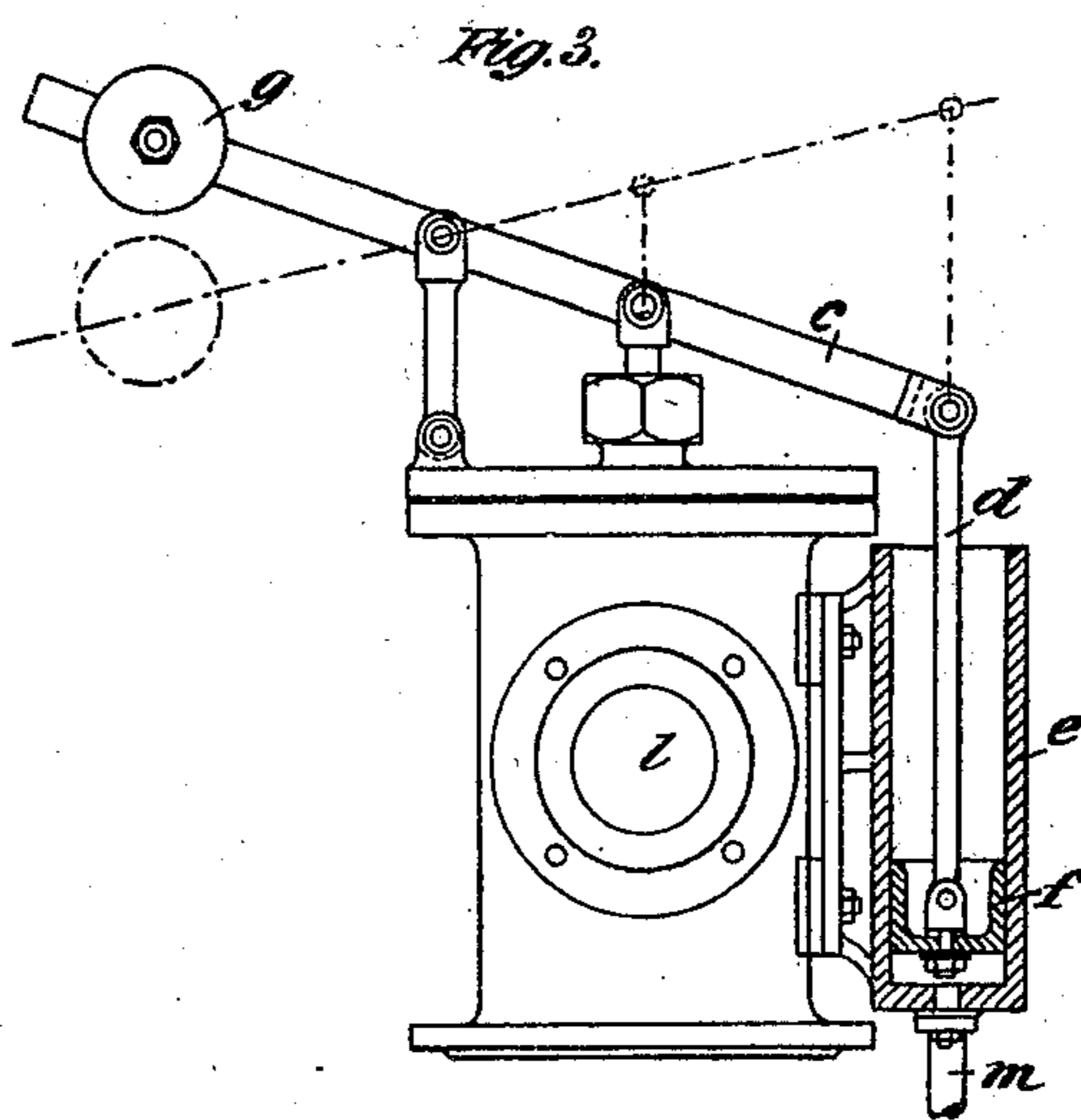
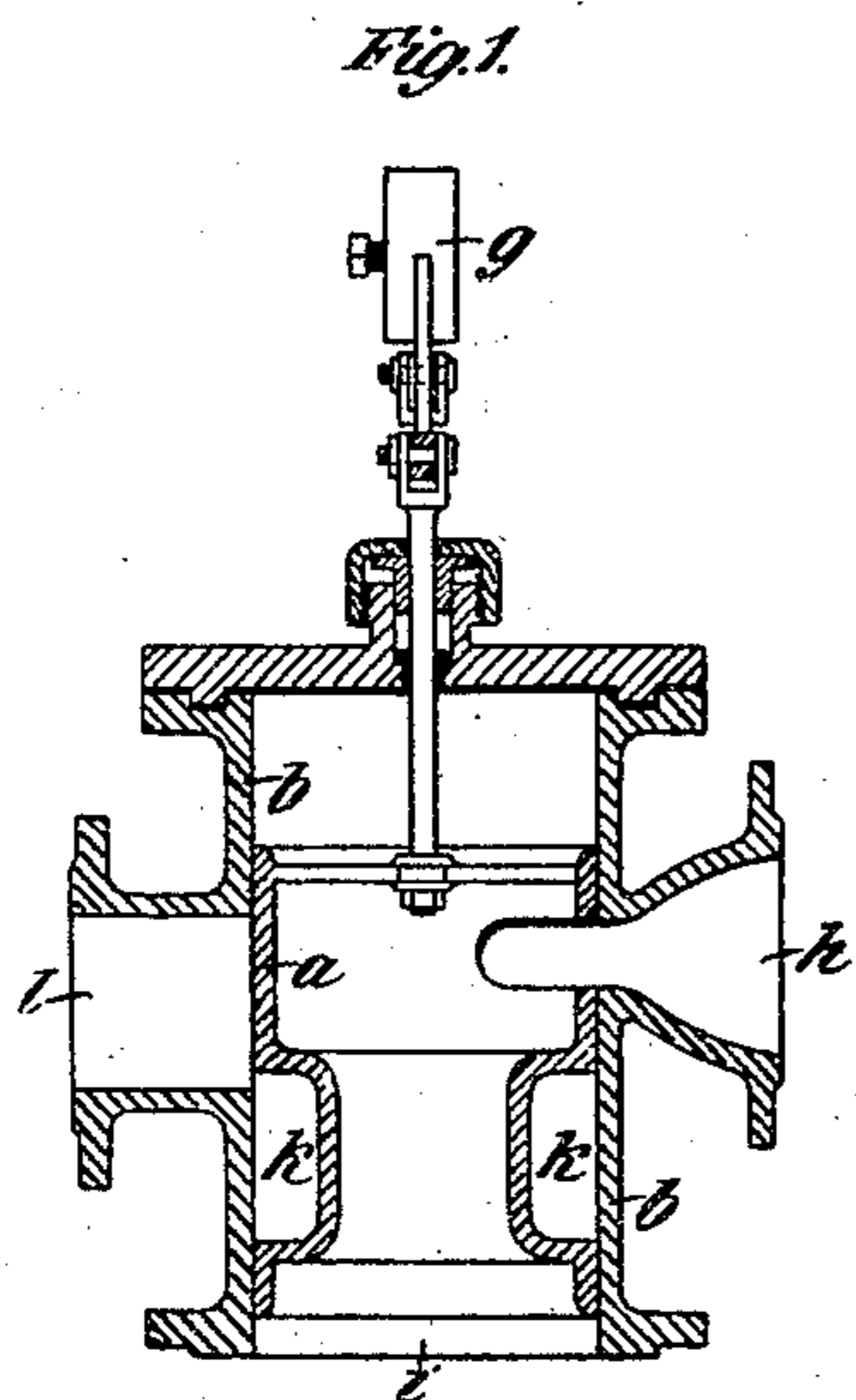
No. 732,748.

PATENTED JULY 7, 1903.

E. KARRER.
EXHAUST MECHANISM.
APPLICATION FILED MAY 22, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES

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Fig. 5.

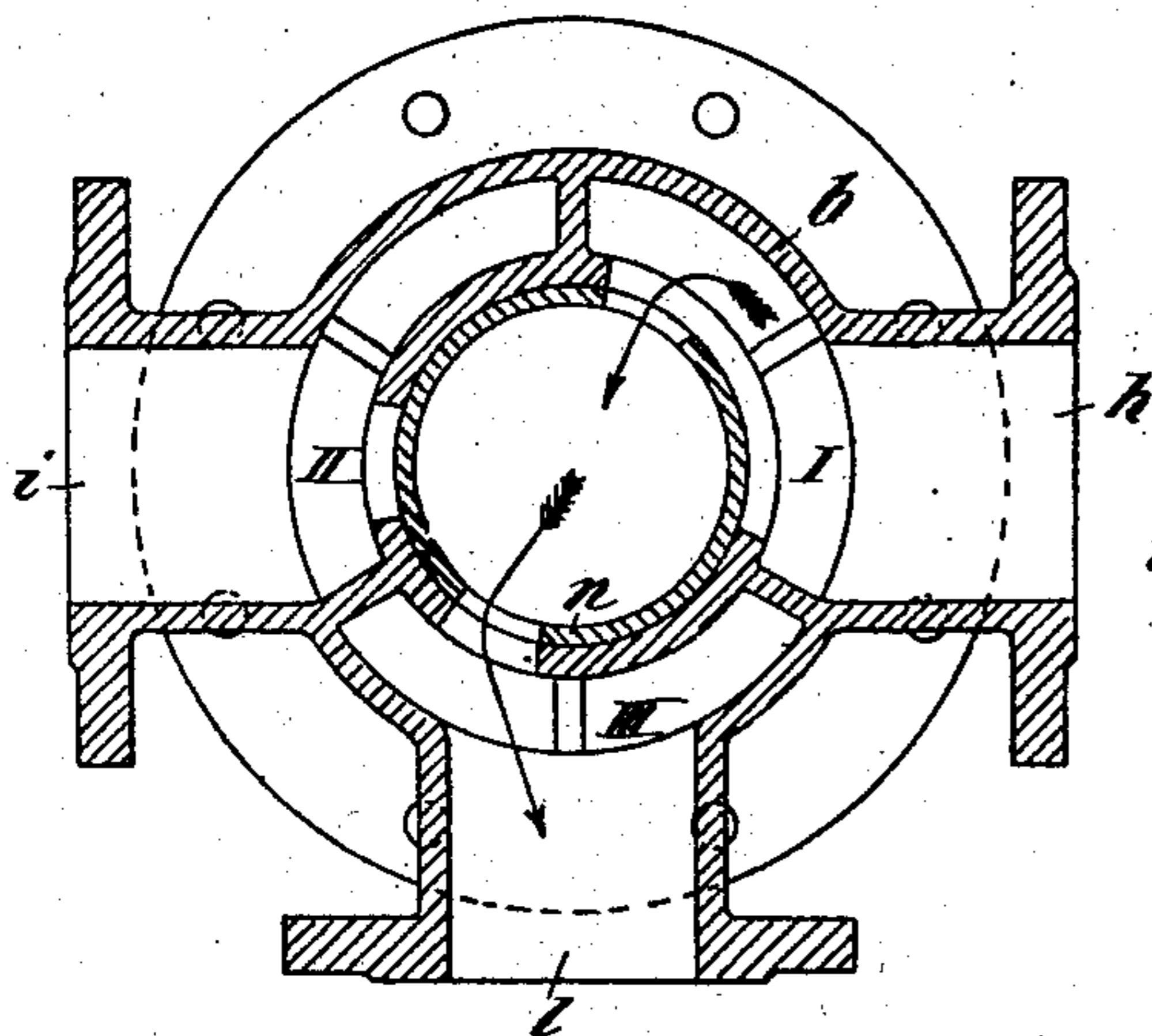


Fig. 6.

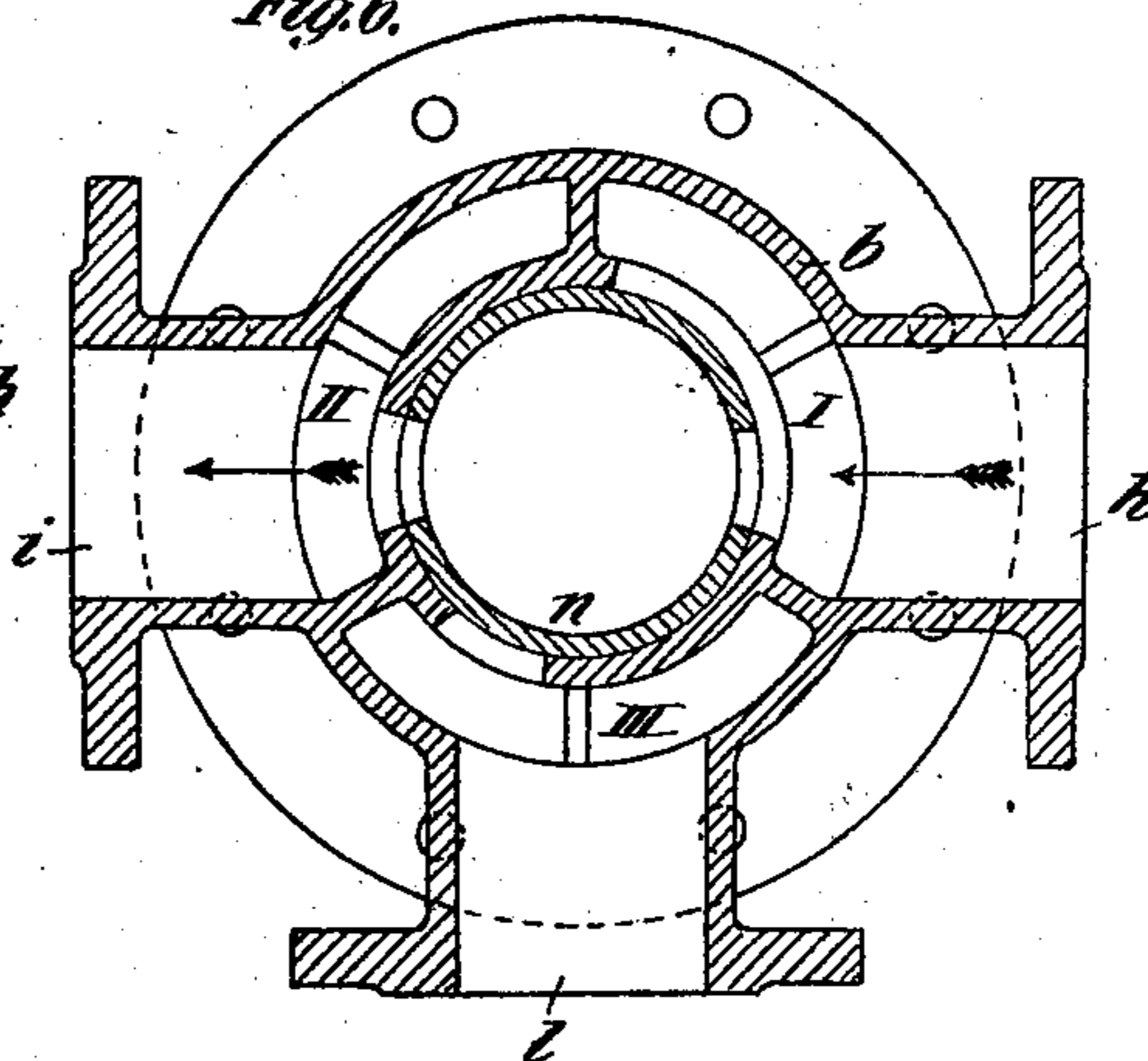


Fig. 8.

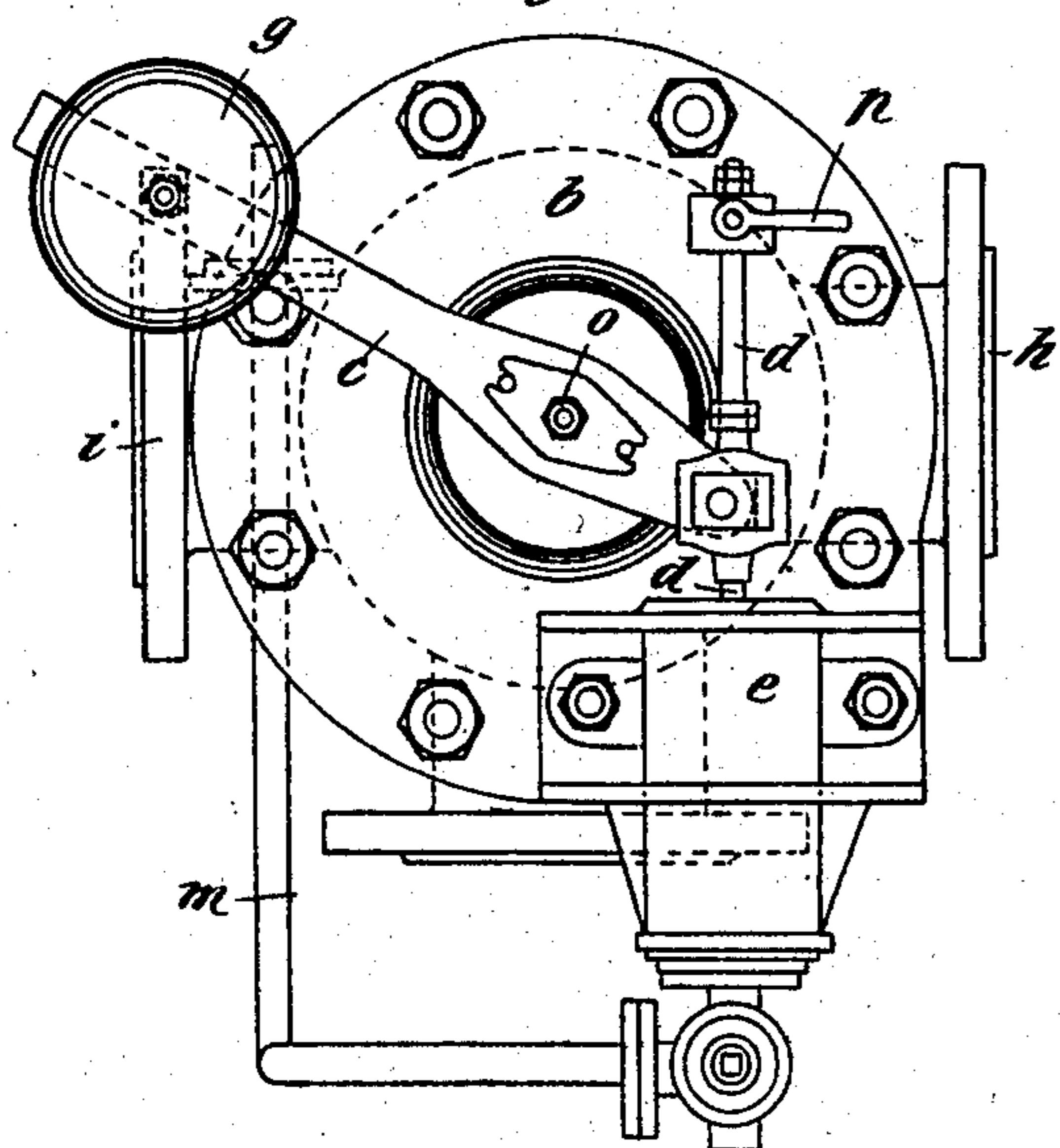
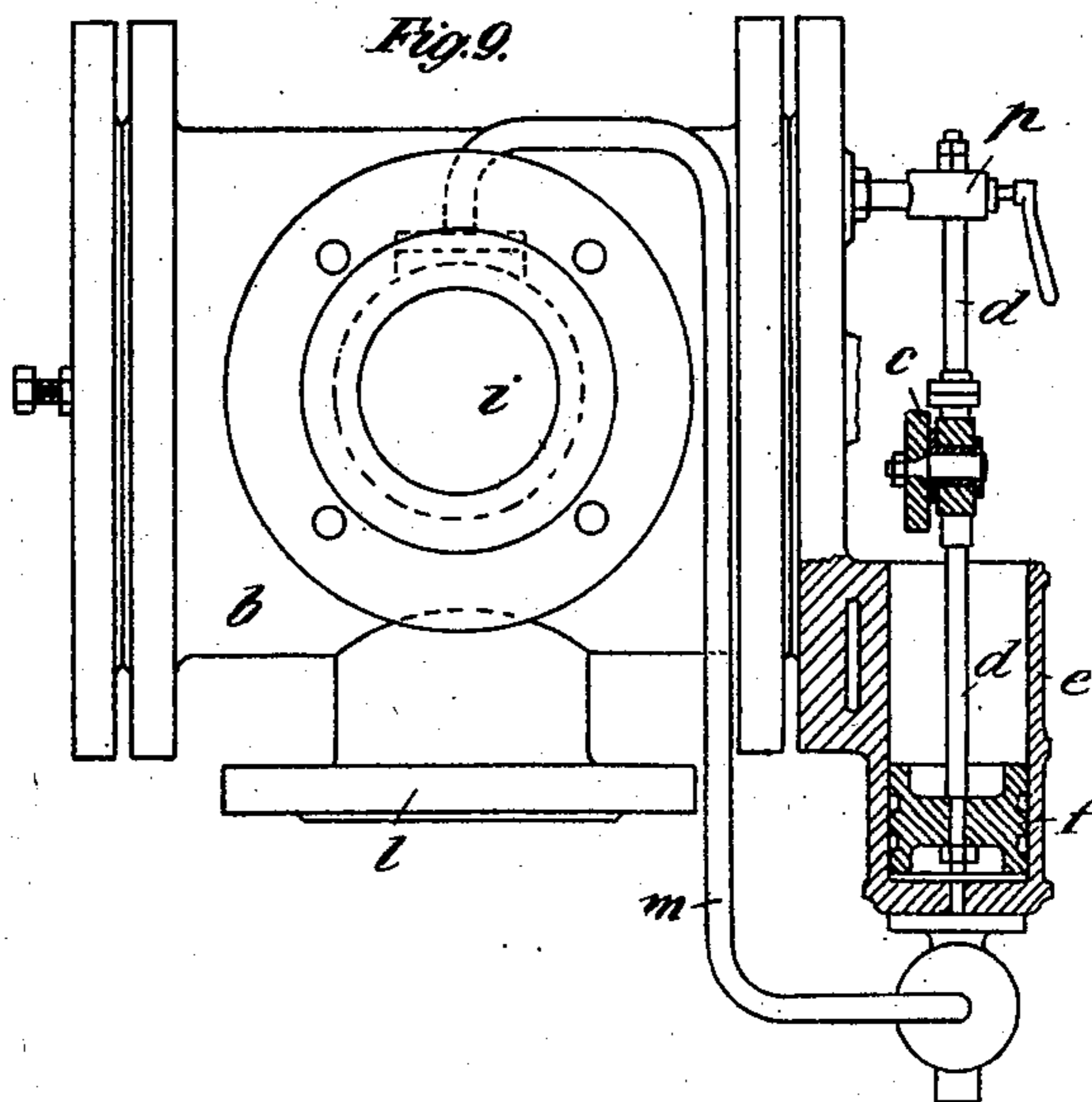


Fig. 9.



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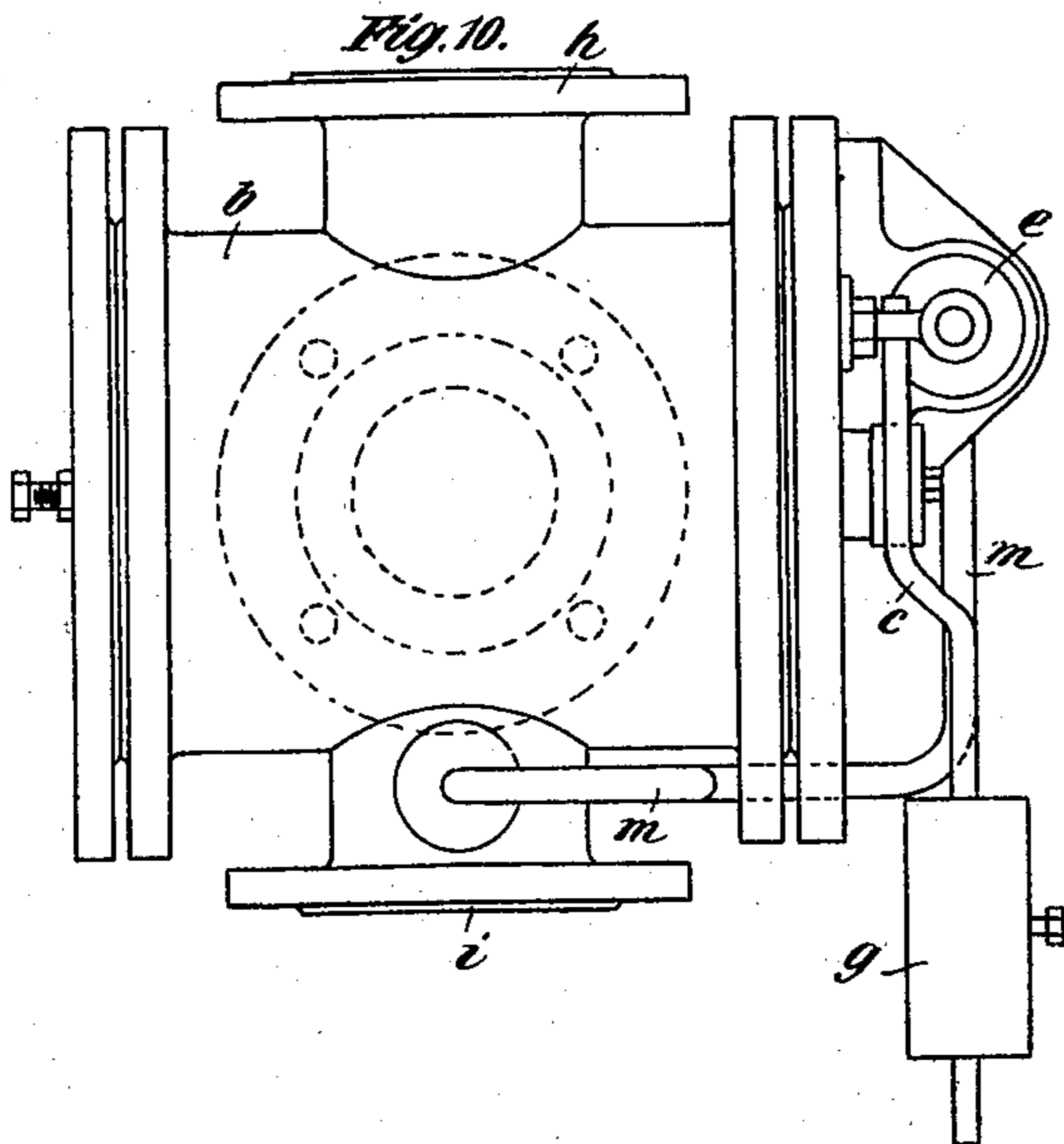
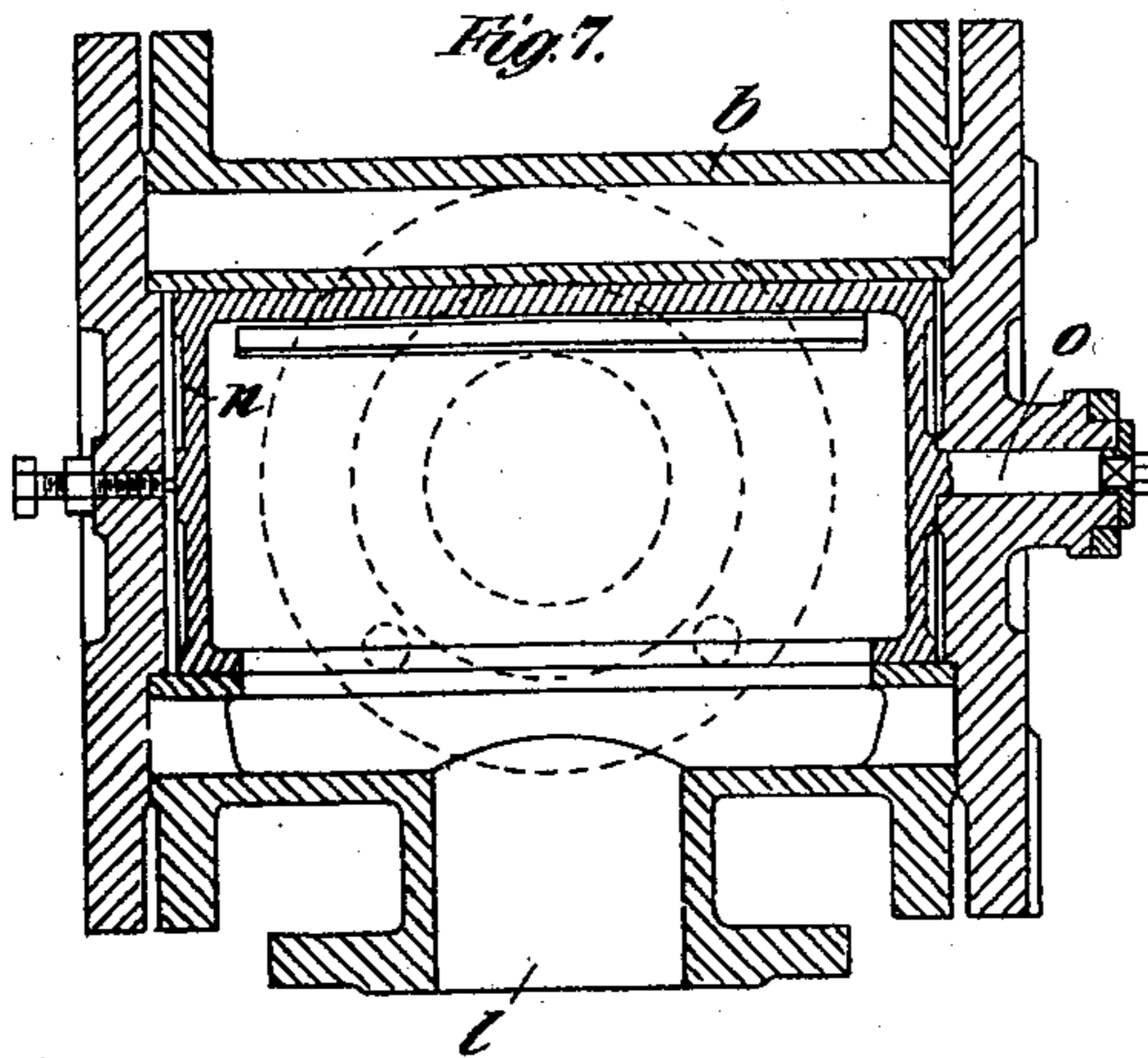
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3 SHEETS—SHEET 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

EDUARD KARRER, OF FRANKFORT-ON-THE-MAIN, GERMANY.

EXHAUST MECHANISM.

SPECIFICATION forming part of Letters Patent No. 732,748, dated July 7, 1903.

Application filed May 22, 1902. Serial No. 108,537. (No model.)

To all whom it may concern:

Be it known that I, EDUARD KARRER, a subject of the King of Prussia, German Emperor, and a resident of Frankfort-on-the-Main, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Exhaust Mechanism, of which the following is a full, clear, and exact description.

10 This invention has for its object a valve arrangement for the exhaust-steam of condensing steam-engines, which arrangement is inserted in the exhaust-passage and automatically adjusts itself under the action of the vacuum in the condenser or in another place to which the exhaust-steam is conveyed, according to the greater or lesser strength of said vacuum, so that the exhaust-steam is discharged to one place or another.

20 The device is characterized by the adjustment of the changing device or reversing-valve taking place automatically not only in one but also in both directions, and the arrangement is also such that in no position of the valve or changing mechanism can the pipe leading to the place containing the vacuum be brought into communication with the other pipe, and thus the vacuum can never suffer by air entering the exhaust-pipe leading to it. This changing mechanism may, for instance, be employed for conveying the exhaust-steam into the open air when there is too low a vacuum in the air-pump, so that all the deleterious consequences are avoided which too low a vacuum may produce, or it may, as an example, be employed for using the exhaust-steam in addition to condensation also for heating water, the exhaust-steam being conducted to the hot-water apparatus so long as its vacuum maintains the changing mechanism in a suitable position, while when a diminution of the vacuum in the water-heating apparatus takes place the exhaust-steam is turned onto the condenser.

45 In the drawings, Figure 1 is a sectional view of the invention. Fig. 2 is a plain view of a section taken horizontally through the middle of Fig. 1. Fig. 3 is a side view with parts in section. Fig. 4 is a plain view. Figs. 5 and 6 are sectional views of a modified form of valve, showing said valve in different positions. Fig. 7 is a longitudinal

view of the valve of Fig. 5. Fig. 8 is an end elevation of the valve-casing of Figs. 5, 6, and 7, showing operating mechanisms in elevation. Fig. 9 is a side view of Fig. 8 with parts in section and parts omitted. Fig. 10 is a plain view of Fig. 8.

The piston slide-valve *a*, Figs. 1 and 2, is adjustably arranged in a cylindrical valve-case *b* and is connected by means of rods *c* *d* with a piston *f*, guided in a cylinder *e*, Fig. 3. From this cylinder *e* a pipe *m* leads to the spot at which there is a vacuum—for instance, to an air-pump or a water-heating apparatus—so that behind the piston *f* there is always the vacuum existing in that apparatus. The device is so regulated by means of a counterweight *g* or in its place another suitable means on the lever *c* that with a good vacuum the piston stands at its lowest position. (Shown in Fig. 3.) The exhaust-steam then passes through an opening *h*, Figs. 1 and 2, into the interior of the piston-slide *a* and from the latter into the pipe *i*, leading to the place where there is vacuum. If the vacuum diminishes, the weight *g* causes the piston-slide *a* to move upward—that is, to change its direction—so that the constriction *k* of the valve *a* communicates with the inlet-nozzle *h*. The exhaust-steam then flows through the constriction *k* around the piston-slide *a* to the discharge-pipe *l*. As soon as the vacuum improves it again acts on the piston *f* and causes the same to again descend in the cylinder *e* against the action of the counterweight *g*, thereby producing a descent of the piston-slide *a* in the cylinder *b*, so that the exhaust-steam pipe again communicates with the interior of the piston-slide *a*, and thereby with the pipe *i*, leading to the place where the vacuum exists. In no position of the piston-slide *a* does the pipe *i*, leading to the vacuum, communicate with the pipe *l*, leading to the other places where the exhaust-steam is to be used.

In Figs. 5, 6, and 7 the piston-slide *a* is replaced by a revoluble cylinder valve or slide *b*, which is connected by means of a weighted lever *c*, Fig. 8, mounted on its axis *o*, and a rod *d*, Figs. 8 and 9, with a piston *f*, guided in the cylinder *e*, which piston stands under the action of the vacuum of the air-pump, water-heating apparatus, or the like, through

a pipe *m*. The branches *h i l* of the valve-casing *b* connect with three separate chambers I II III of the valve-casing, and the interior of the revoluble slide *n* connects alternately with these chambers by means of openings or passages formed in this slide *n* and in the inner walls of the chambers, said openings being provided in the requisite sizes and numbers. With a good vacuum under which the piston *f* stands at its lowest end position, Fig. 9, the revoluble slide *n* occupies the position shown in Fig. 6, in which the steam entering through the opening *h* passes straight through into the interior of the revoluble slide *n* and out of the latter into the chamber II. If, on the contrary, the vacuum diminishes, the weight *g* falls and causes the revoluble slide *n* to turn out of the position shown in Fig. 6 into the end position, Fig. 5, in which the exhaust-steam flowing into the interior of the piston-slide *n* through the pipe *h* instead of passing to chamber II and pipe *i* flows farther on the chamber III and discharge-pipe *l*, which leads to the other arrangements for utilizing the exhaust-steam. As soon as the vacuum again improves it here also again acts on the piston *f* and causes the same to descend in the cylinder *e*, and thereby the revoluble slide *n* is moved back from the position shown in Fig. 5 into the position shown in Fig. 6, so that the exhaust-steam pipe *h* again communicates with the pipe *i*, leading to the place where there is a vacuum. In this form of construction also in no position of the shifting mech-

anism *n* does the pipe leading to the place where there is vacuum communicate with the pipe *l*, leading to the other places where the steam is utilized. For adjusting the device by hand the guide-rod *d* on the valve-piston *f* is also provided with an adjusting device *p*.

The slide *a* in Fig. 1, as well as the oscillating slide in Figs. 5 and 6, serves as a valve.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In combination, in means for changing the course of exhaust-steam, a casing, a valve therein having back-and-forth movement, said casing having an inlet-port *h* for the exhaust-steam, an inlet-port *i* for said exhaust-steam to direct it to the point where the vacuum is formed and a port *l* for discharging the steam to another point of use, a cylinder *e*, a piston *f* therein, a connection between the said piston and the valve, a connection between the cylinder *e* and the vacuum apparatus and a counterweight for operating the connections of the valve in opposition to the piston *f*, the said valve in all its positions cutting off communication between the ports *i* and *l*, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

EDUARD KARRER.

Witnesses:

JEAN GRUND,
CARL GRUND.