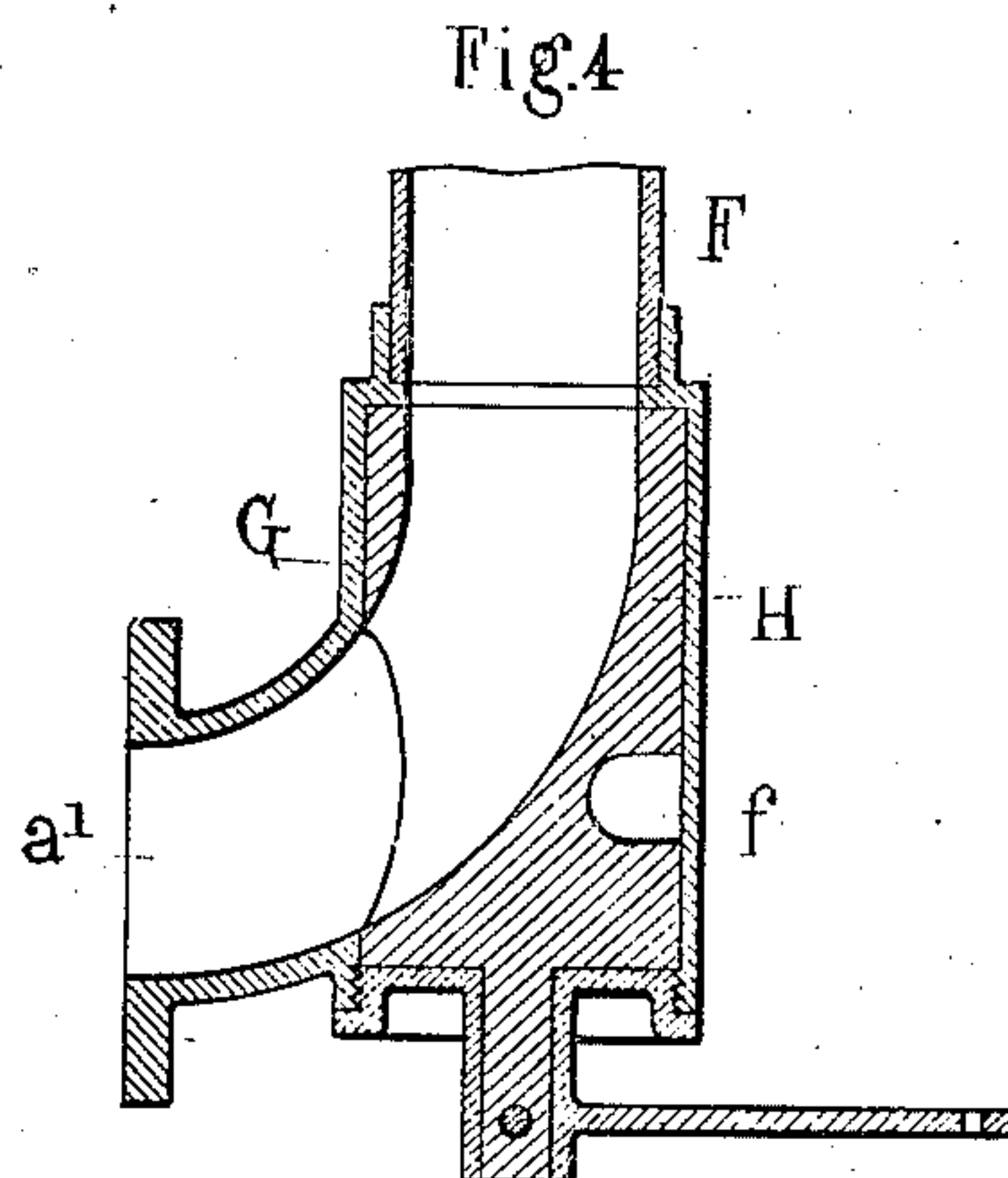
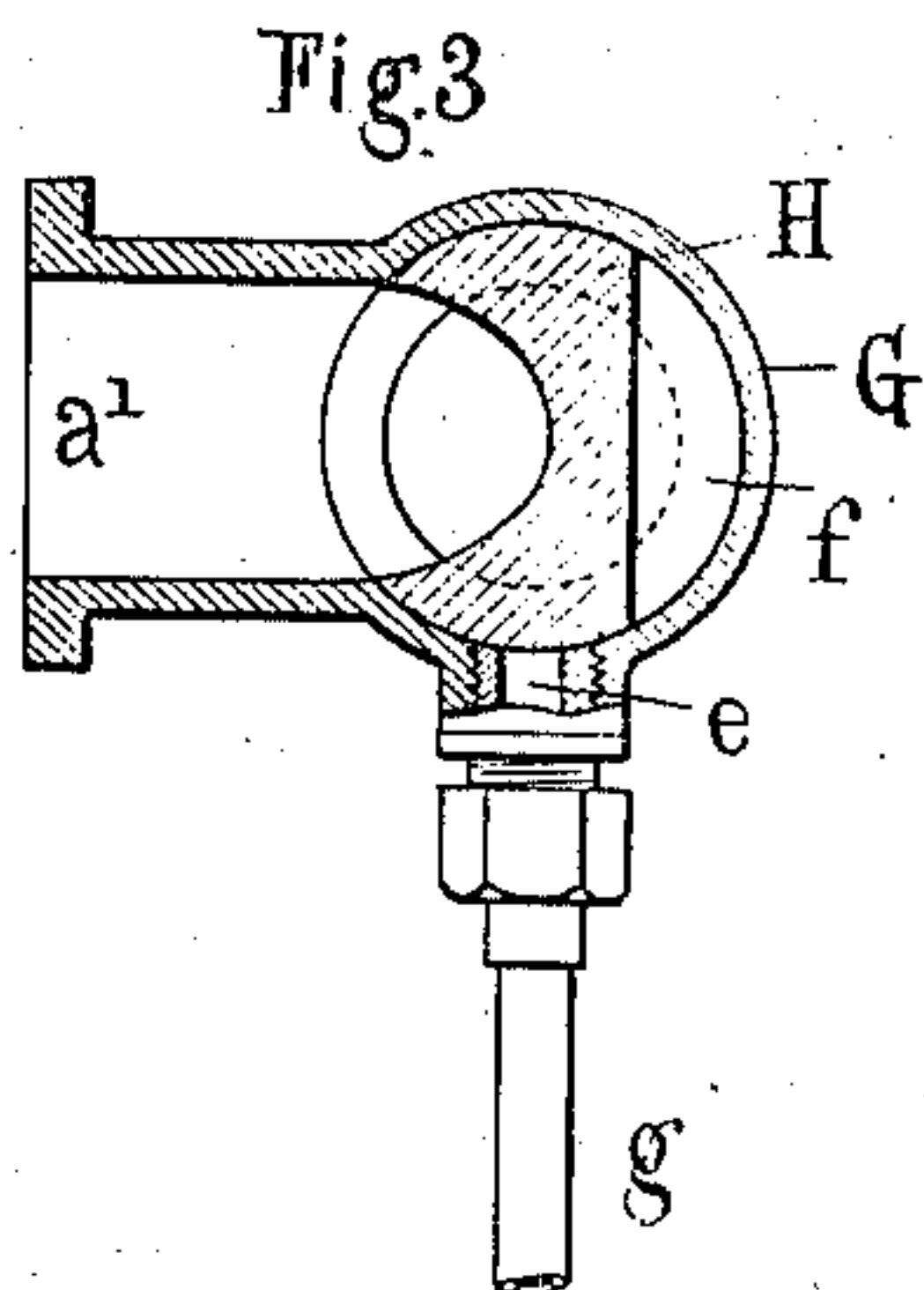
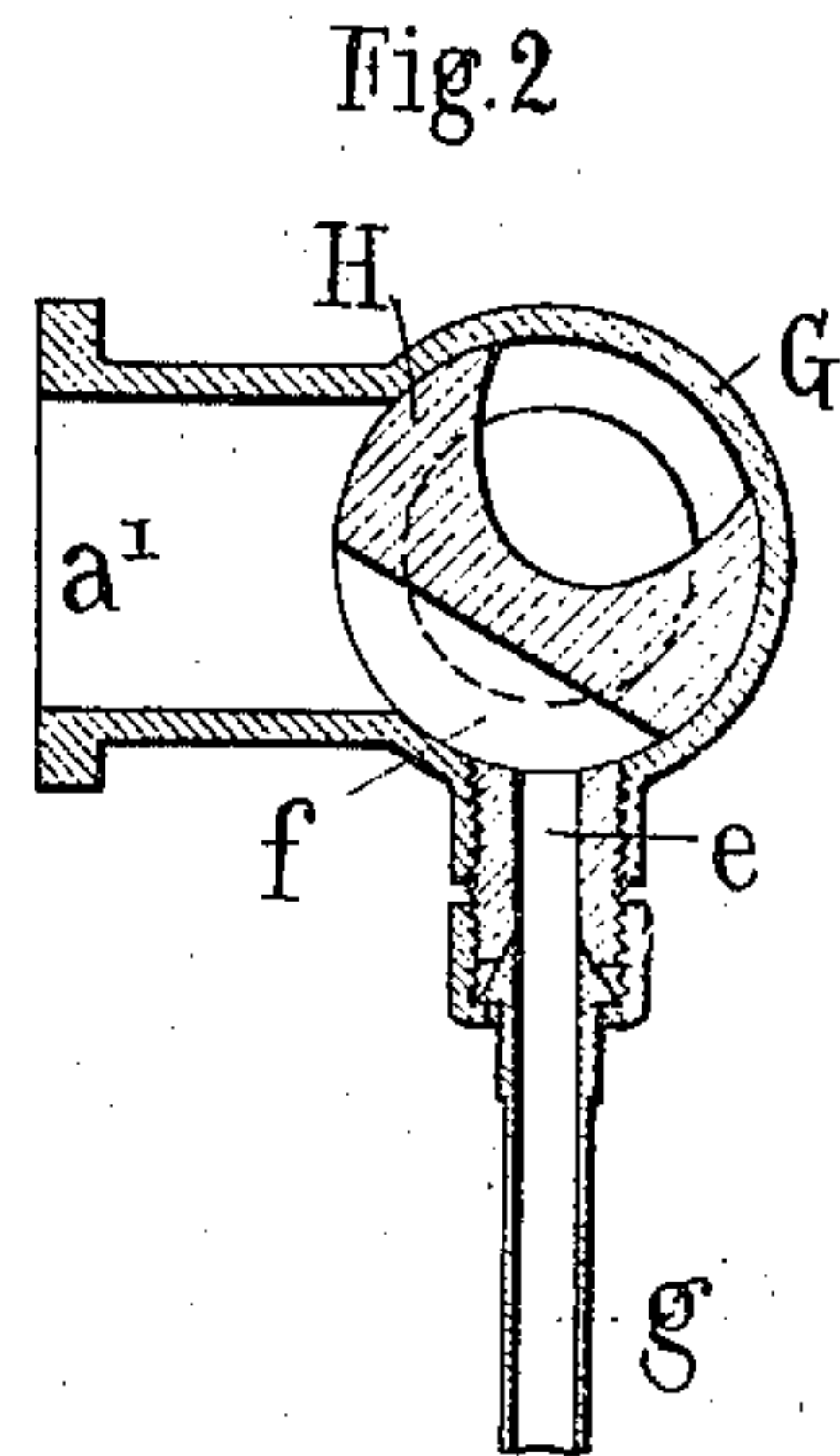
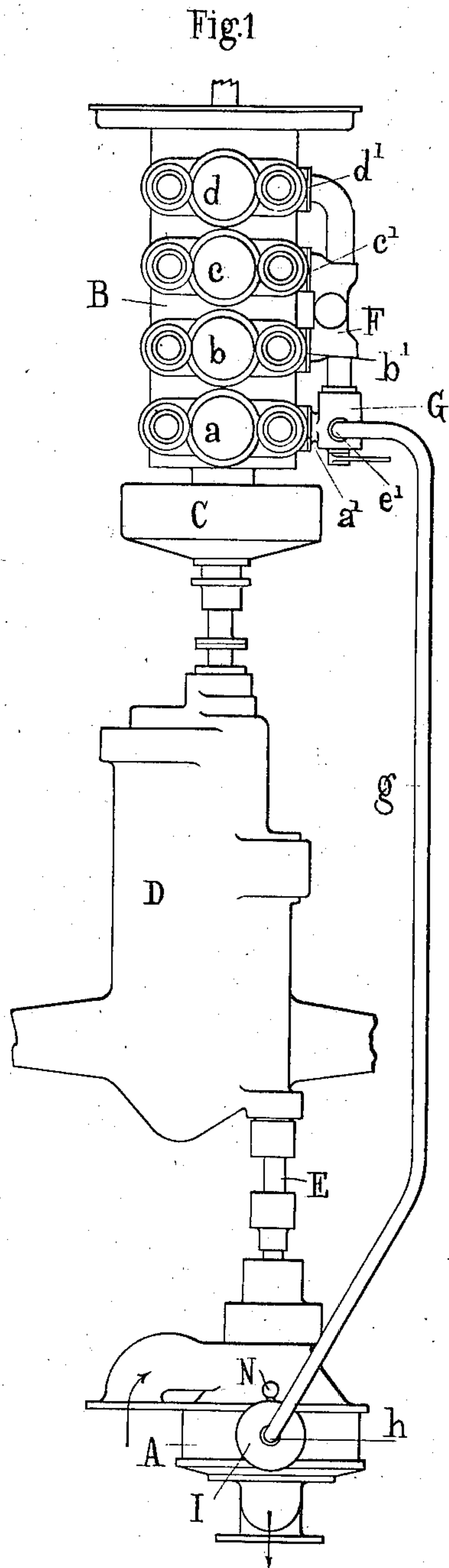


L. DESMARAIS.  
 MEANS FOR PRIMING CENTRIFUGAL PUMPS.  
 APPLICATION FILED OCT. 8, 1908.

995,846.

Patented June 20, 1911.

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

Fig.5

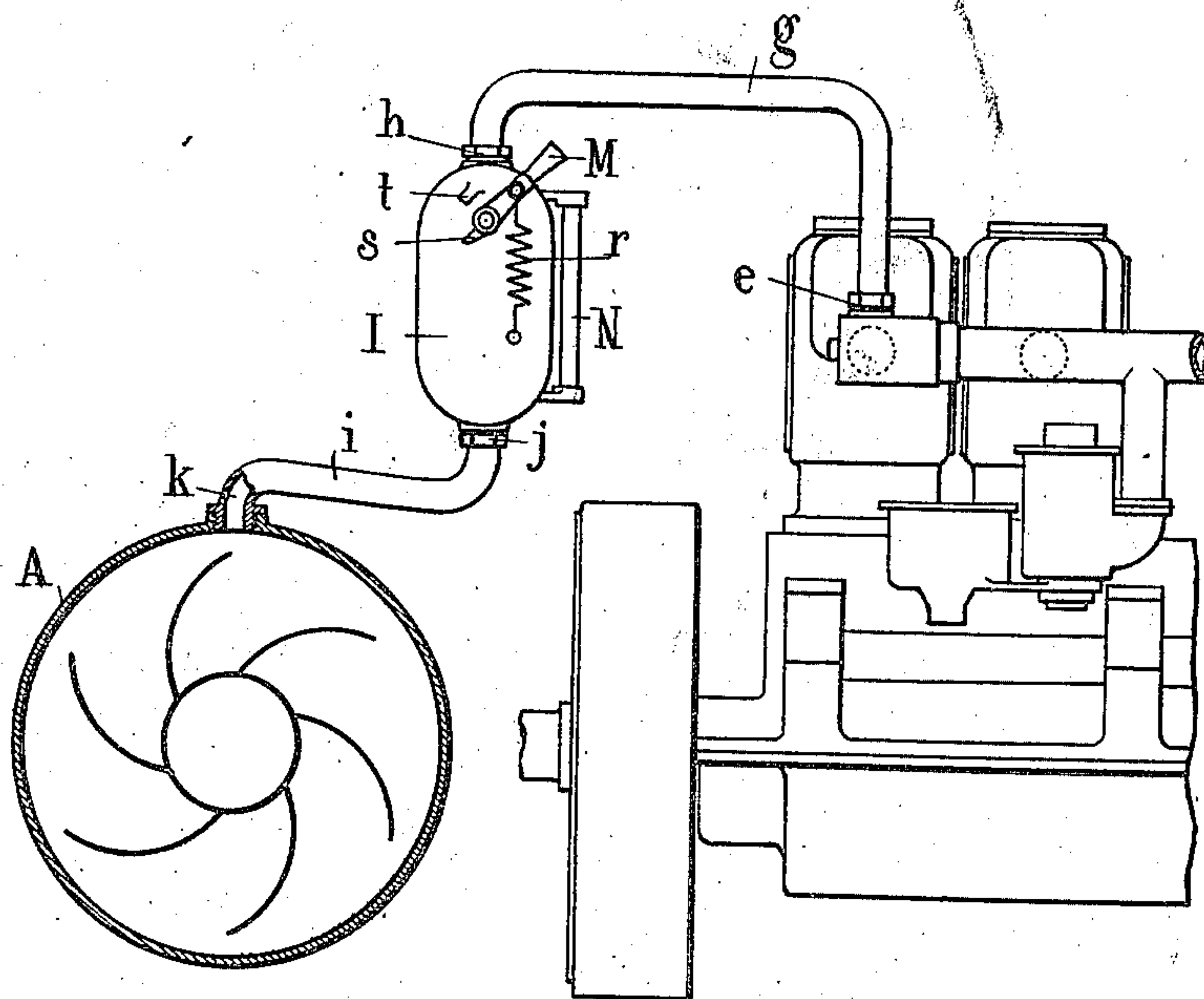
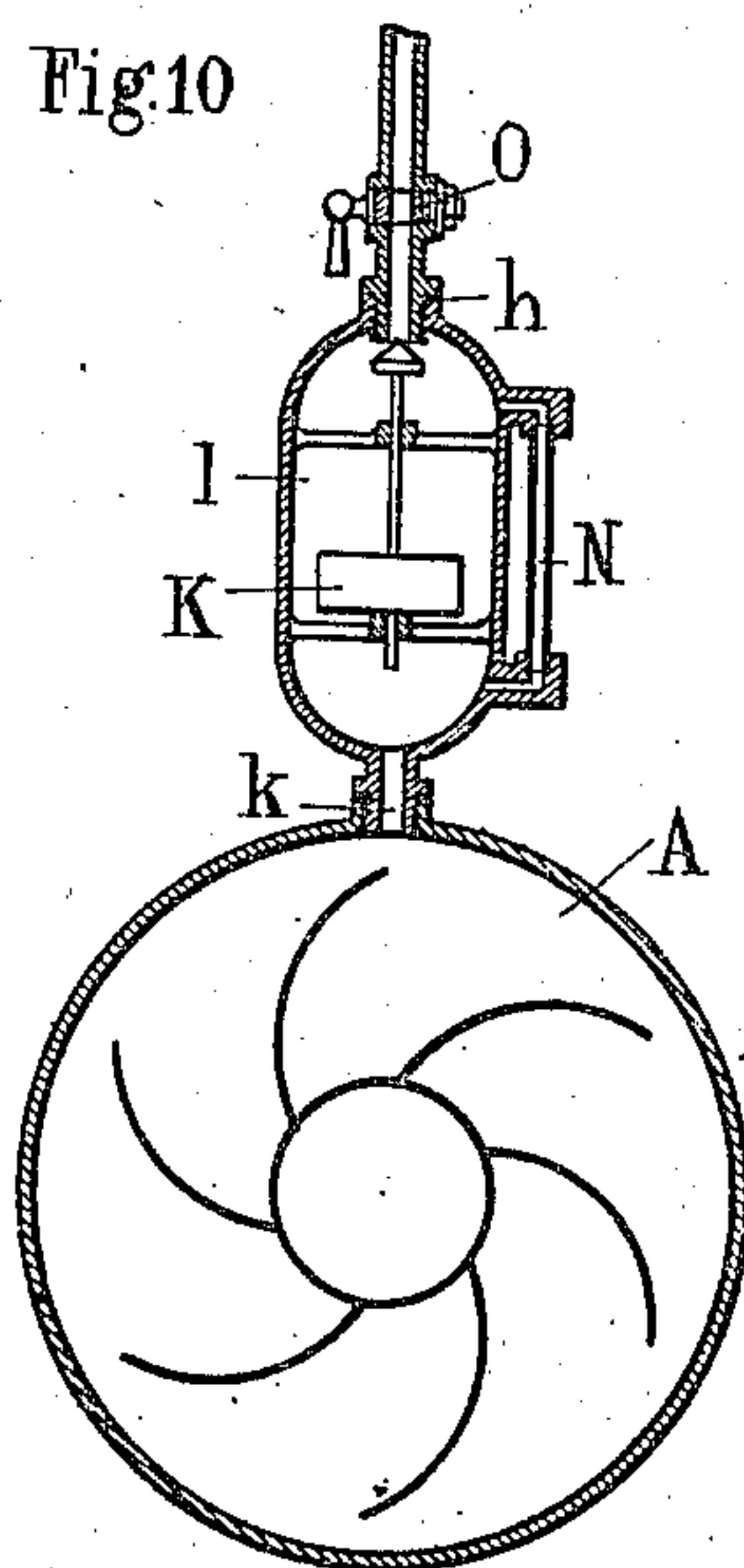


Fig.10



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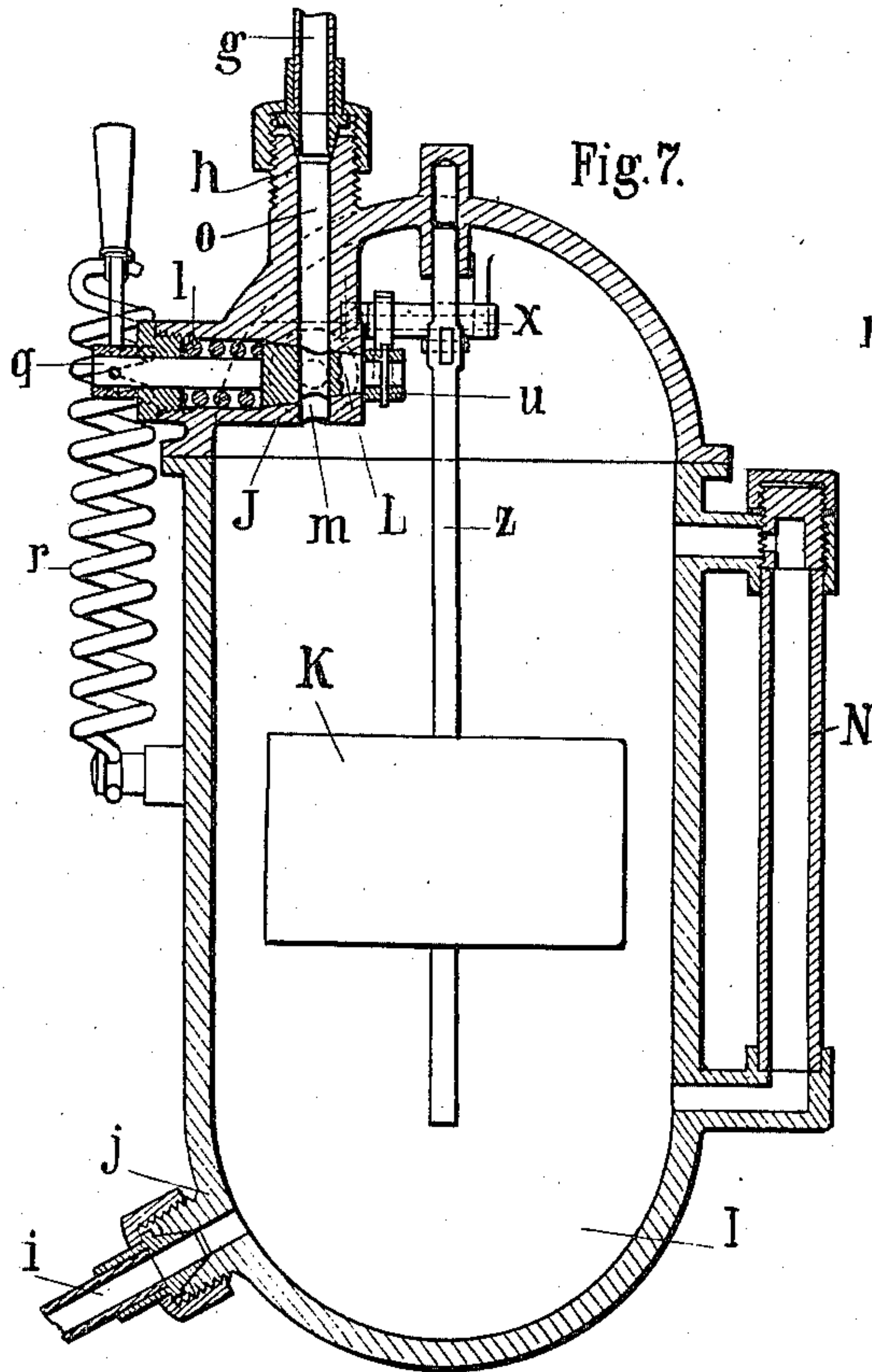


Fig. 7.

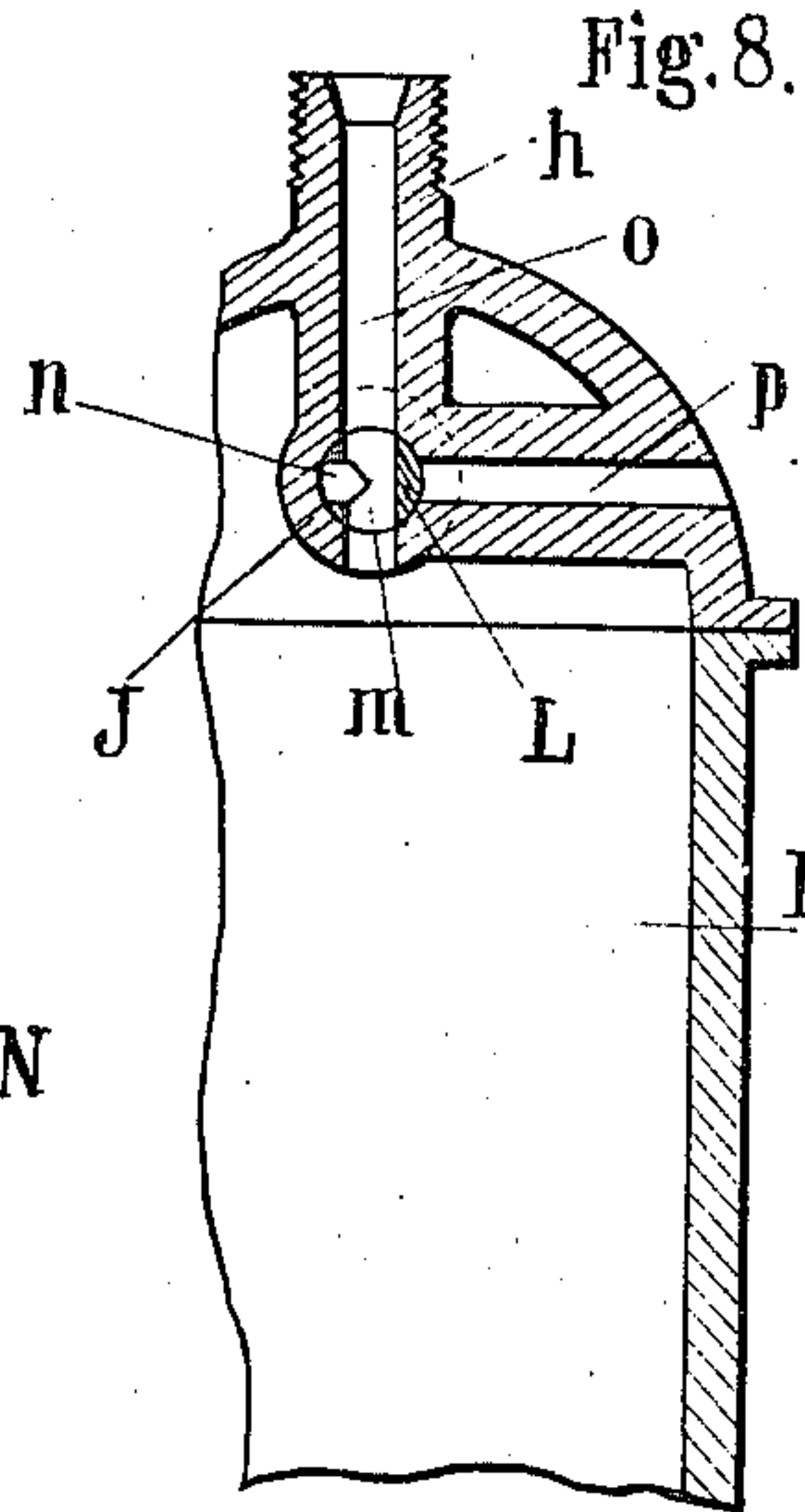


Fig. 8.

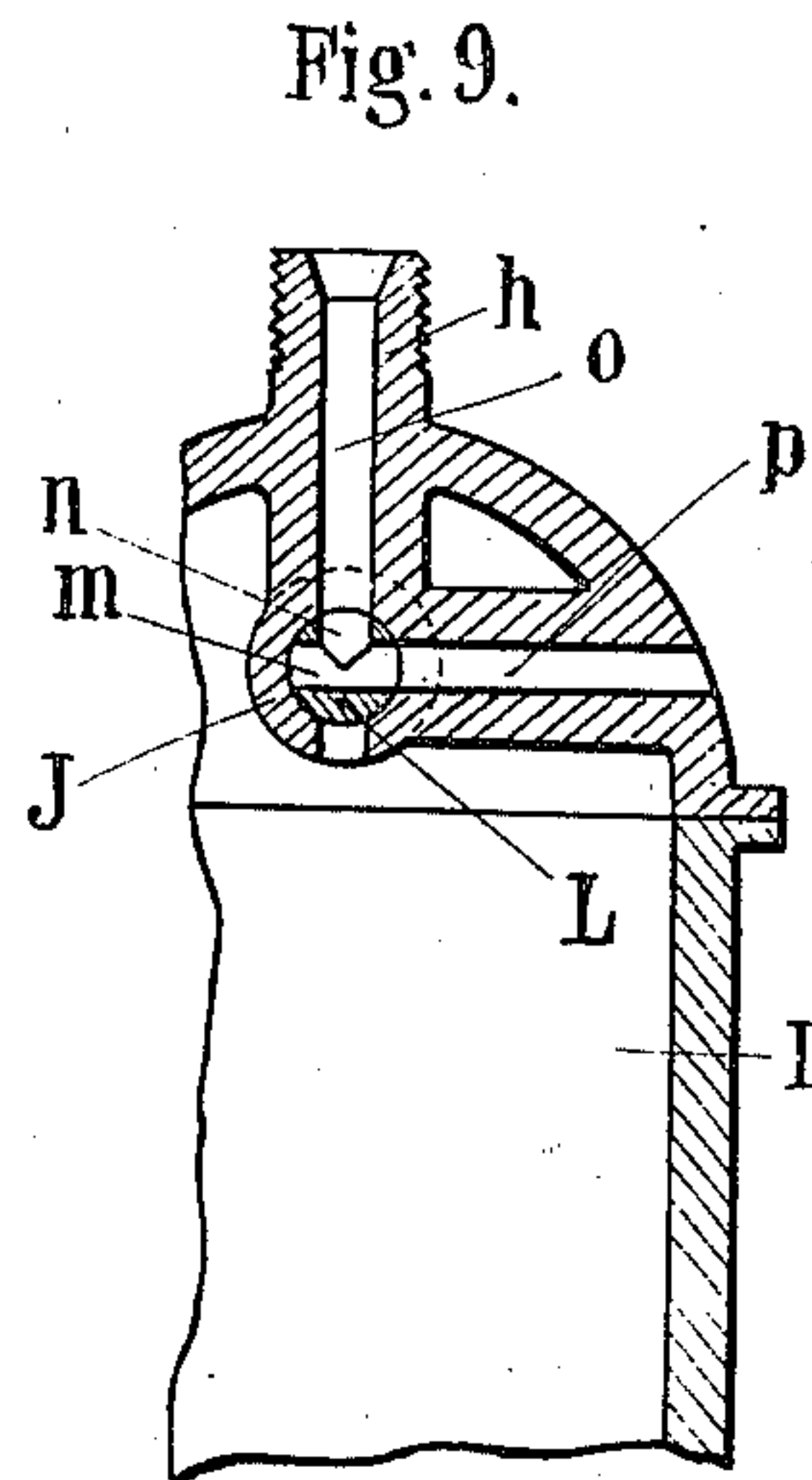


Fig. 9.

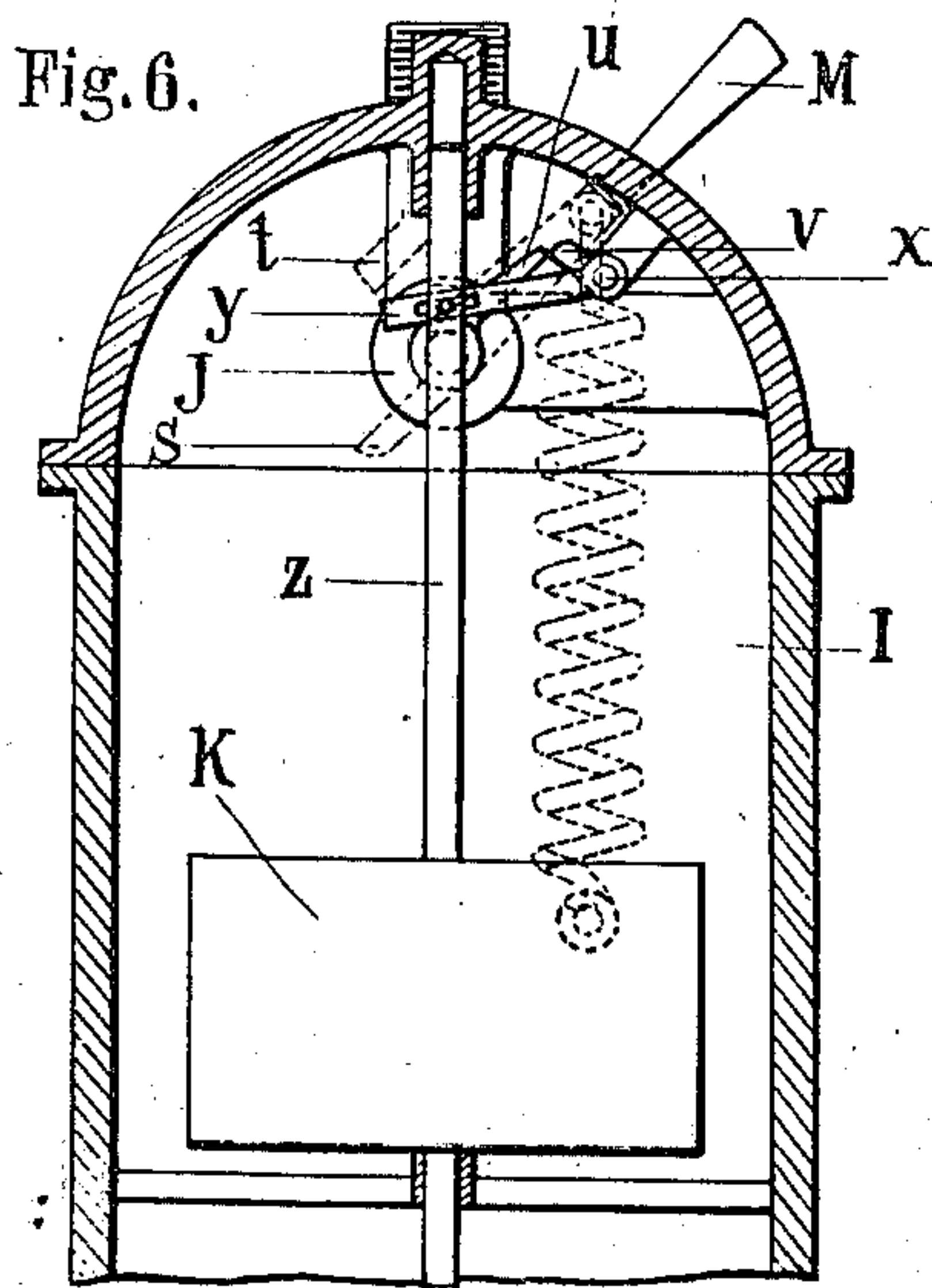


Fig. 6.

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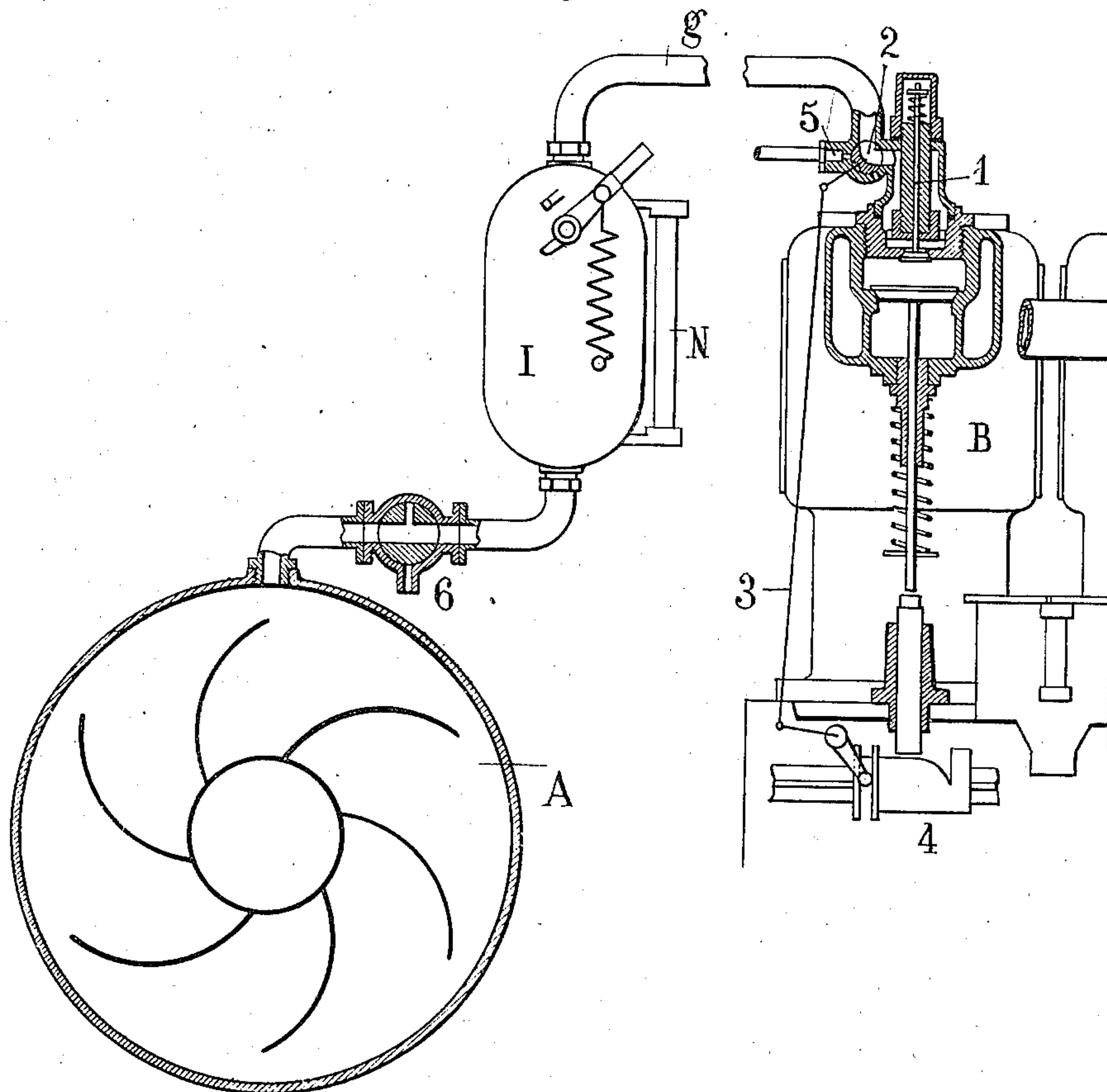
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4 SHEETS—SHEET 4.

Fig. 11



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# UNITED STATES PATENT OFFICE.

LÉON DESMARAIS, OF PARIS, FRANCE, ASSIGNOR TO DELAHAYE AND COMPANY, LIMITED, OF LONDON, ENGLAND, A CORPORATION OF ENGLAND.

## MEANS FOR PRIMING CENTRIFUGAL PUMPS.

995,846.

Specification of Letters Patent. Patented June 20, 1911.

Application filed October 8, 1908. Serial No. 456,765.

*To all whom it may concern:*

Be it known that I, LÉON DESMARAIS, a citizen of the French Republic, residing at 10 Rue du Banquier, Paris, France, have invented certain new and useful Improvements in Means for Priming Centrifugal Pumps, of which the following is a full, clear, and exact description.

This invention relates to an arrangement for effecting the priming of a centrifugal pump by using the air suction of one or several cylinders of the motor serving to drive the pump.

In order to carry out this invention it suffices that the internal combustion engine or other analogous motor be of several cylinders arranged in such a manner that by a temporary movement of a valve connected with the induction pipe some cylinders remain employed in driving the motor, while others of the cylinders, together working as a suction pump can be employed to withdraw the air contained in the centrifugal pump and the water-suction pipes of this pump. This piping being sealed in the water or liquid which the pump is intended to raise, and the delivery being closed, the liquid will replace the air withdrawn and will fill the pump which is thus primed.

Figure 1 is a plan showing the entire mechanism in a general way; Fig. 2 is a detail showing in cross section the valve used for the alternative purposes of connecting certain cylinders of the internal combustion engine with the valve mechanism of the engine or with the pipe leading to the centrifugal pump; Fig. 3 is a detail view similar to Fig. 2, but showing the valve in question occupying a position different from that which it occupies in Fig. 2; Fig. 4 is a substantially horizontal section through the valve shown in Figs. 2, 3; Fig. 5 is a view partly in elevation and partly in section of the mechanism shown in Fig. 1; Fig. 6 is a fragmentary section through the float valve chamber associated with the centrifugal pump; Fig. 7 is a vertical section through the float valve chamber, but taken in a different plane from Fig. 6; Fig. 8 is a fragmentary section through the float valve chamber, showing a detail of the valve mounted therein; Fig. 9 is a view somewhat similar to Fig. 8, but showing the valve occupying a different position; Fig. 10 is a vertical section through the float valve

chamber and the centrifugal pump; Fig. 11 is a side view partly in section of a modified form of the invention.

In the drawings, Fig. 1 represents by way of example, the application of this invention to a centrifugal pump A operated by the explosion engine B of an automobile fire brigade vehicle; the flywheel C contains the clutch connecting the motor B to the change speed gear D of the automobile arranged for driving the pump A by the coupling E.

Upon the motor B with four cylinders *a, b, c, d*, is shown the gas induction piping F, supplying each of the cylinders *a, b, c, d*, by the orifices *a', b', c', d'*, respectively. The invention is carried out by placing upon this piping F a cock G shown in section and in detail, Figs. 2, 3 and 4, and allowing by the operation of the plug H: either to establish the normal communication of gas from F to *a'*, the plug H being in the position of Figs. 3 and 4; or else to stop this communication and to establish by the position of the plug H indicated in Fig. 2, communication of *a'* with the orifice *e* by means of the notch *f* in the plug H.

The diagram, Fig. 5, shows that the orifice *e* is connected to the body of the pump A by means of a pipe *g* attached at *h* to a chamber I and of the pipe *i* connected at *j* to the chamber I and at *k* to the body of the pump A. The chamber I comprises a mechanism represented in detail in Figs. 6, 7, 8 and 9 and composed of a pawl-controlled cock J and a float K intended to prevent automatically any introduction of liquid into the cylinder of the motor when the pump is primed and by the same automatic action to furnish to the cylinder a supply of external air so as to avoid the cylinder continuing to operate and only increasing uselessly the intensity of the vacuum established. For this purpose, the plug L of the cock J maintained upon its cone by the spring *l* is perforated from side to side by a hole *m* into which enters at right angles a hole *n* in such a way that when the plug L is in the position of Fig. 8, the interior of the chamber I is in communication by the passage *o*, the union *h* and the pipe *g* with the valve G, while the plug L being in the position of Fig. 9, the chamber is closed and the valve G is put into communication with the open air by the passage *p*, the valve J,



the passage *o* and the pipe *g*. On the other hand, the plug *L* carries fixed upon the other extremity of its spindle *q* a handle *M* to which is hooked the spring *r* recalling the extremity *s* of this lever *M* against the fixed claw *t*; on the other end of the spindle *q* in the interior of the chamber *I* is fixed a small lever *u* of length suitable to press upon the pawl *v* pivoted at *x* and controlled by its lever *y* and the rod *z* of the float *K*. A level-gage *N* can be arranged upon the chamber *I* for checking the level.

*Working.*—The explosion engine being started normally in light working, the plug *H* of the cock *G* being in the position of Figs. 3 and 4, the suction pipe of the pump sealed in the liquid, and the delivery closed, it will suffice to place the handle *M* of the cock *J* in the position of Figs. 5 and 6, the spring *r* will be tensioned and the handle *M* will remain in this position by the engagement of the lever *u* upon the point of the pawl *v* placed in a suitable position by the float *K* which is at the bottom of its stroke; the plug *L* of the cock *J* will thus be in the position of Fig. 8, placing the cock *G* in communication with the pump-body *A* by the pipe *g*, the interior of the chamber *I* and the pipe *i*. If then the plug *H* of the cock *G* is passed to the position of Fig. 2, the cylinder *A* will cease to take part in the working of the engine, but its inlet and exhaust valves continuing their functions and the engine remaining actuated by the other cylinders, the piston of the cylinder *a* will suck in at *f* the air contained in the pipes and the pump *A*, the liquid to be raised will ascend by the suction pipe of the pump, replace the air and arrive at the chamber *I* in which it will lift the float *K*, release by angular displacement of the pawl *v* the lever *u* of the plug *L* of the cock *J*, which recalled by the spring *r* will stop at the position of Fig. 9 by contact of the point *s* of the lever *M* upon the claw *t*. The chamber *I* will be closed, the liquid raised will remain in its position and the cylinder *a* will be supplied with air by the orifice *p*. The plug *H* of the cock *G* being then returned to the position of Figs. 3 and 4, the motor will resume its complete operation, it will suffice to engage the pump for the latter to come into action, since it is filled with liquid and consequently primed.

Fig. 10 represents a simpler automatic apparatus which equally suffices to carry out this invention; the float *K* of the chamber *I* in rising closes the suction pipe of the motor by a needle and a security valve *O* is added also and could equally suffice by itself if one were satisfied to observe the arrival of the liquid in the chamber *I* by the level-checking tube *N*.

Fig. 11 represents a modification in which an automatic valve 1 allows of attaching the

priming pipe of the pump *A* to the cylinder or cylinders of the motor *B* employed for the priming, without modifying the gas piping as before; a two way cock 2 is connected by a transmission such as 3 to the cams 4 controlling the admission and exhaust valves of the cylinder, in such a way that by opening this cock 2 for the priming the normal distribution of the motor is modified and on one hand the gas admission valve is no longer raised by its cam and on the other hand the exhaust valve is on the contrary raised on all the discharge (or inward) strokes of the piston. In the drawing which represents a motor with lateral valves, only one of them is seen, but the cock 2 is connected in a similar manner to the other valve situated on the other side; this connection of the cock to the valve cams of the motor can moreover be applied to any modifications according to their construction. It results from this arrangement that the engine cylinder used for priming works in this way as a two-stroke air-pump, by the automatic lift of the valve 1 and the two-stroke operation of the exhaust valve. Thus priming is obtained more rapidly than if the cylinder works with four strokes as in the preceding arrangement; by closing the cock 2, the lift of the automatic valve 1 is suppressed and the normal distribution of the cylinder is reestablished. When the cock 2 is shut, it opens the orifice 5 of the priming pipe which then allows of clearing the pipe by operating the blow-off or scavenging cock 6.

The drawings represent the application of this invention to a pump actuated by an explosion engine and more particularly to the installation of an automobile pump intended for fire or salvage equipment; but it is evident that the invention applies in the same manner to any pump-installation, fixed or movable, operated by a motor whatever be its system, steam, compressed air or other, provided that one of the elements of any kind of this motor normally taking part in its working, can be utilized momentarily as suction pump for the priming of the operated pump which being a centrifugal pump, can only suck when it is primed.

Having thus described my invention, what I claim as such and desire to secure by Letters Patent is:—

1. The combination with the motor having a plurality of cylinders and a centrifugal pump, of a connection between one or more of the working cylinders of the motor and the pump, and means for interrupting the normal working of the said cylinders and for connecting said cylinders to the pump for the purpose specified, said means comprising a two-way distributing device connected with the induction pipe of the said cylinders, and means interposed in the pipe



connecting the cylinders and the pump for preventing access of liquid to the motor.

2. Means for priming centrifugal pumps, comprising an explosion engine actuating  
5 the pump, a plurality of working cylinders to said explosion engine, a two-way cock placed in the induction pipe of a number of said cylinders for interrupting their normal working, means controlled by said two-way  
10 cock for causing the suction strokes of said interrupted cylinders to exhaust the centrifugal pump, a chamber to which liquid rises when the pump is primed, a float in said chamber, and a pawl-controlled cock

operated through the rise of said float to 15 break the communication between such interrupted cylinders and the pump when the latter is primed, said cock then placing said interrupted cylinders in communication with the open air. 20

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

LÉON DESMARAIS.

Witnesses:

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GUSTAVE DUMONT.