

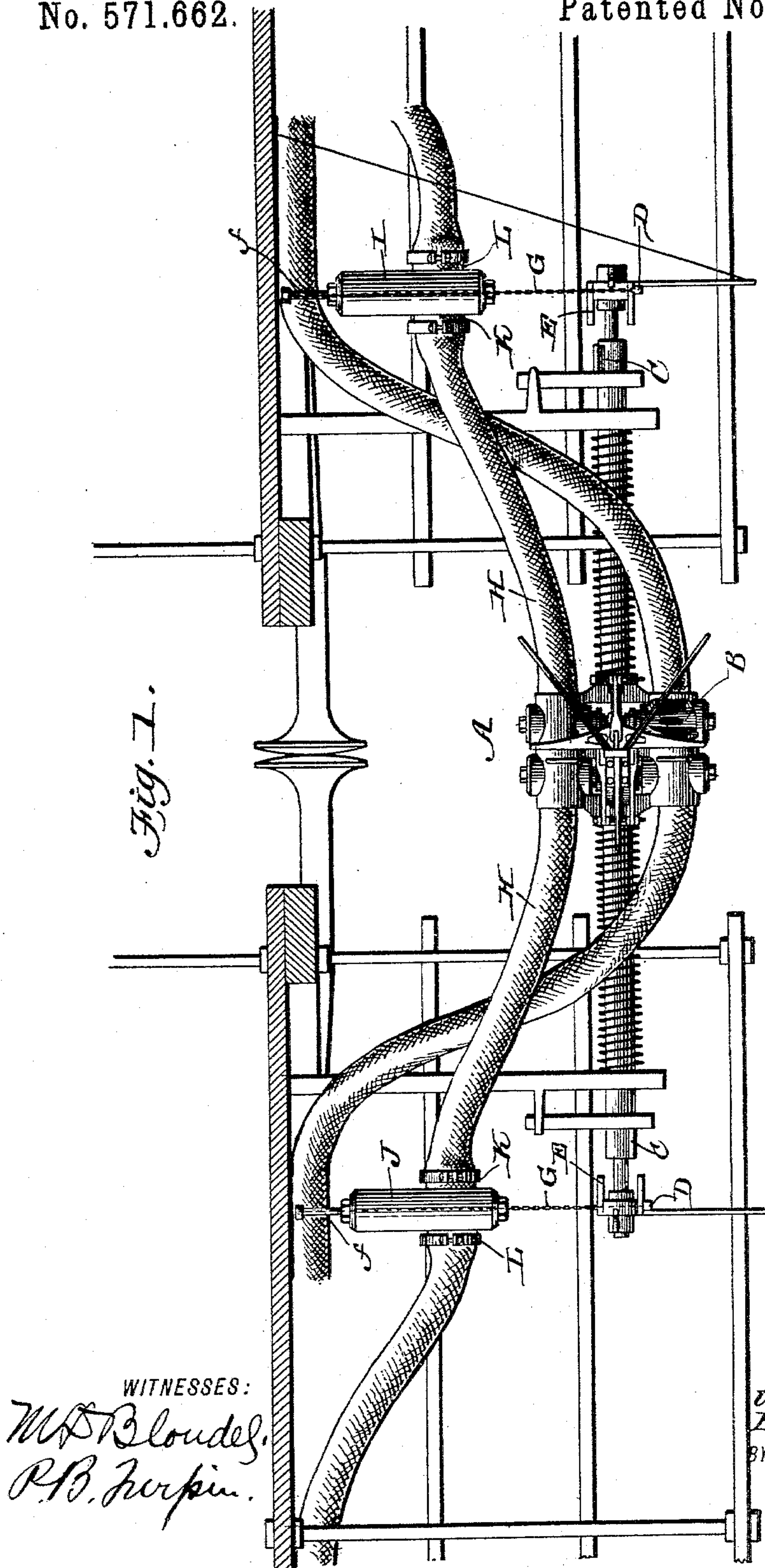
(No Model.)

3 Sheets—Sheet 1.

W. A. & B. S. H. HARRIS.  
AIR BRAKE COUPLING.

No. 571.662.

Patented Nov. 17, 1896.



WITNESSES:

*W. B. Cloude,*  
*R. B. Furpin.*

INVENTORS  
*William A. Harris*  
*Benjamin S. H. Harris.*  
BY *Munn & Co.*  
ATTORNEYS.

(No Model.)

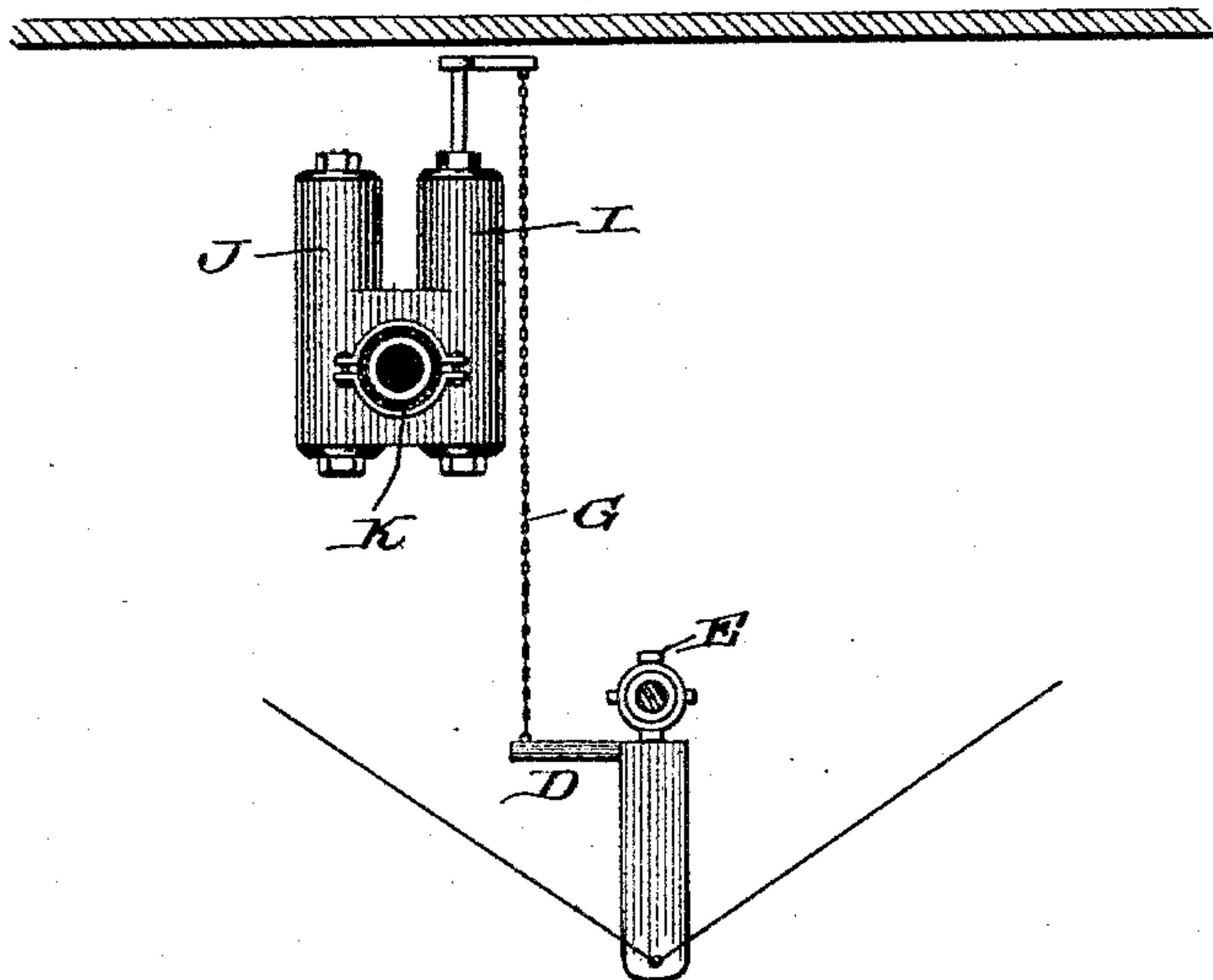
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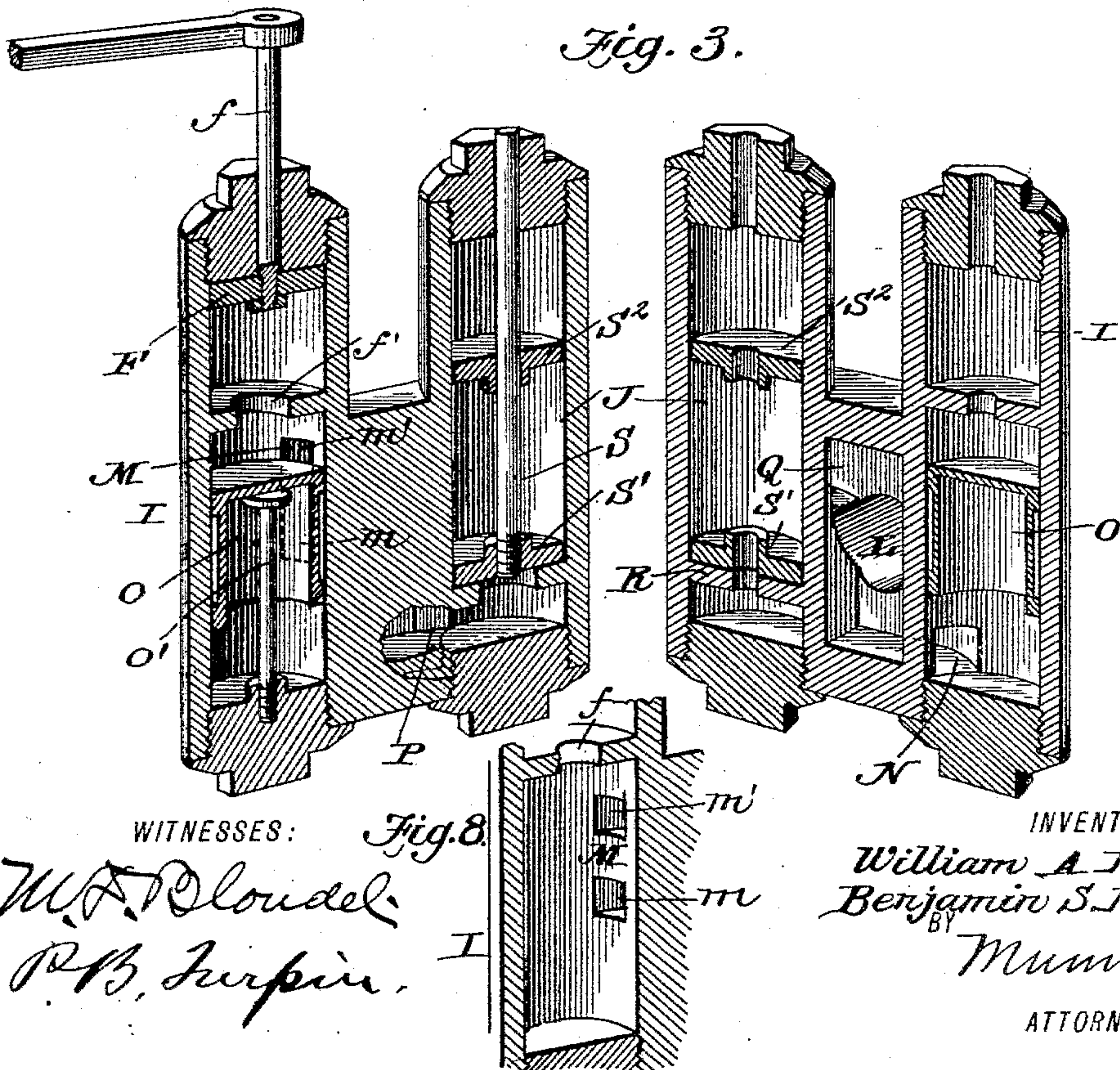
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*Fig. 2.*



*Fig. 3.*



WITNESSES:

*Fig. 3.*

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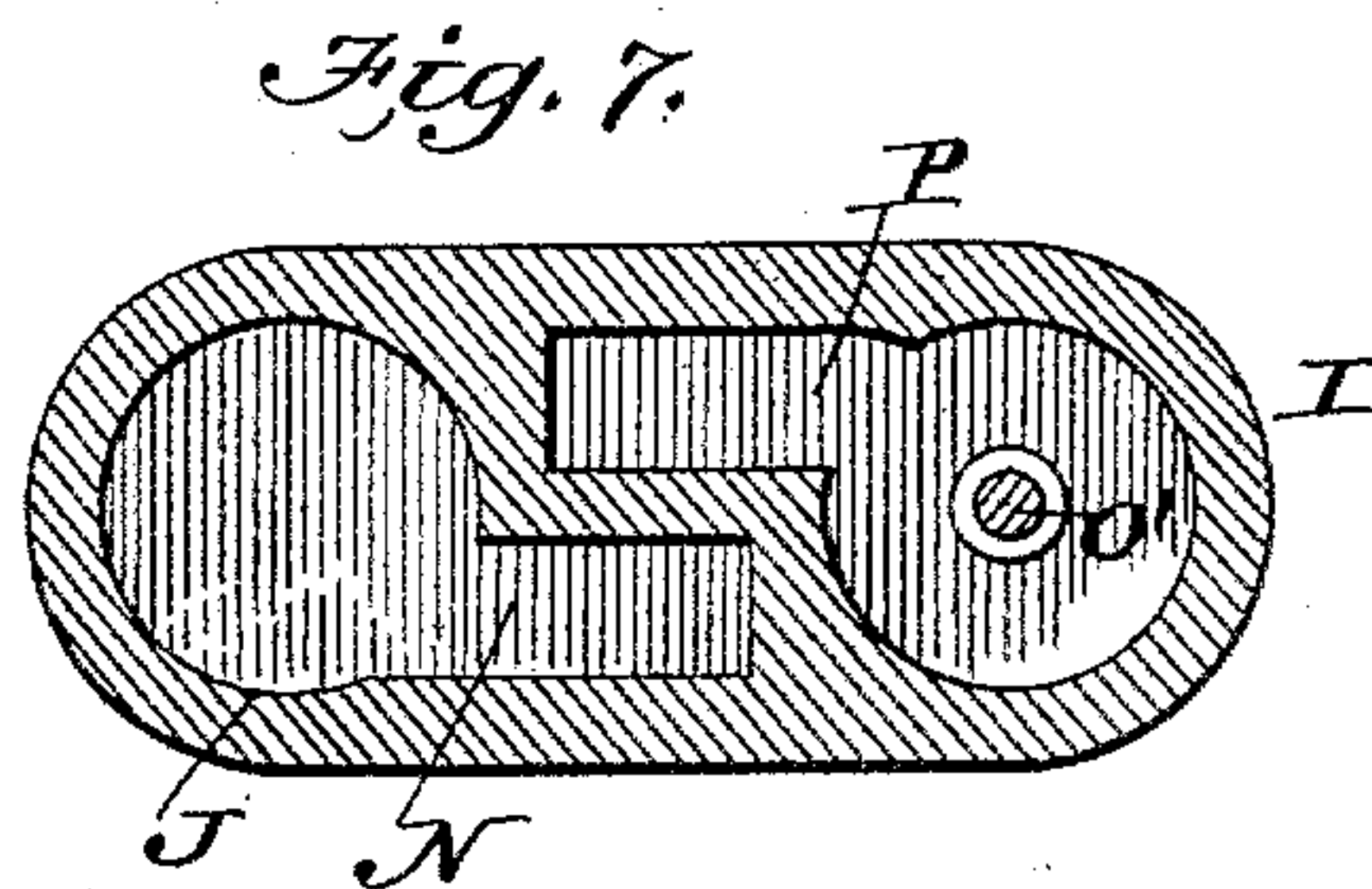
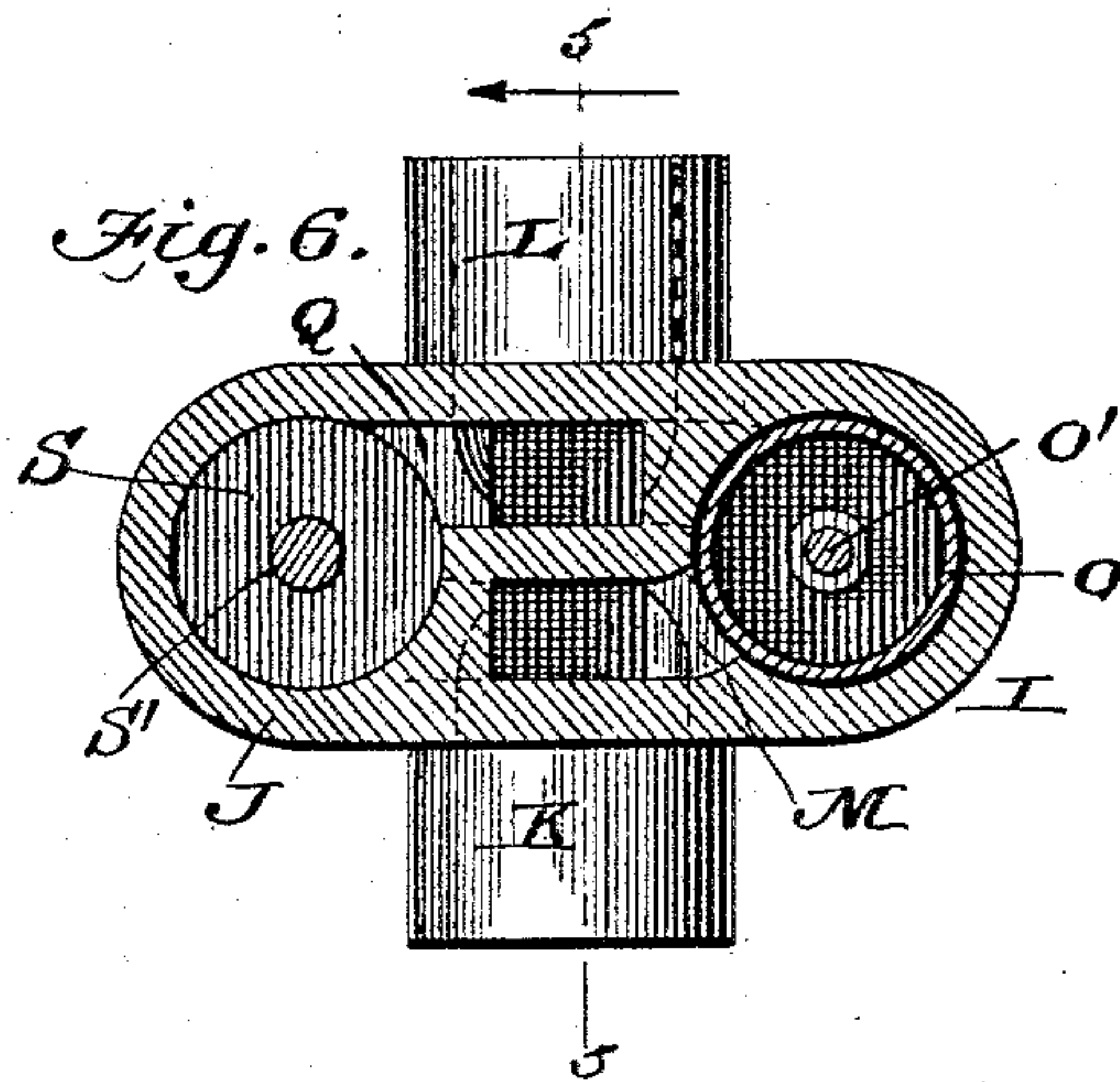
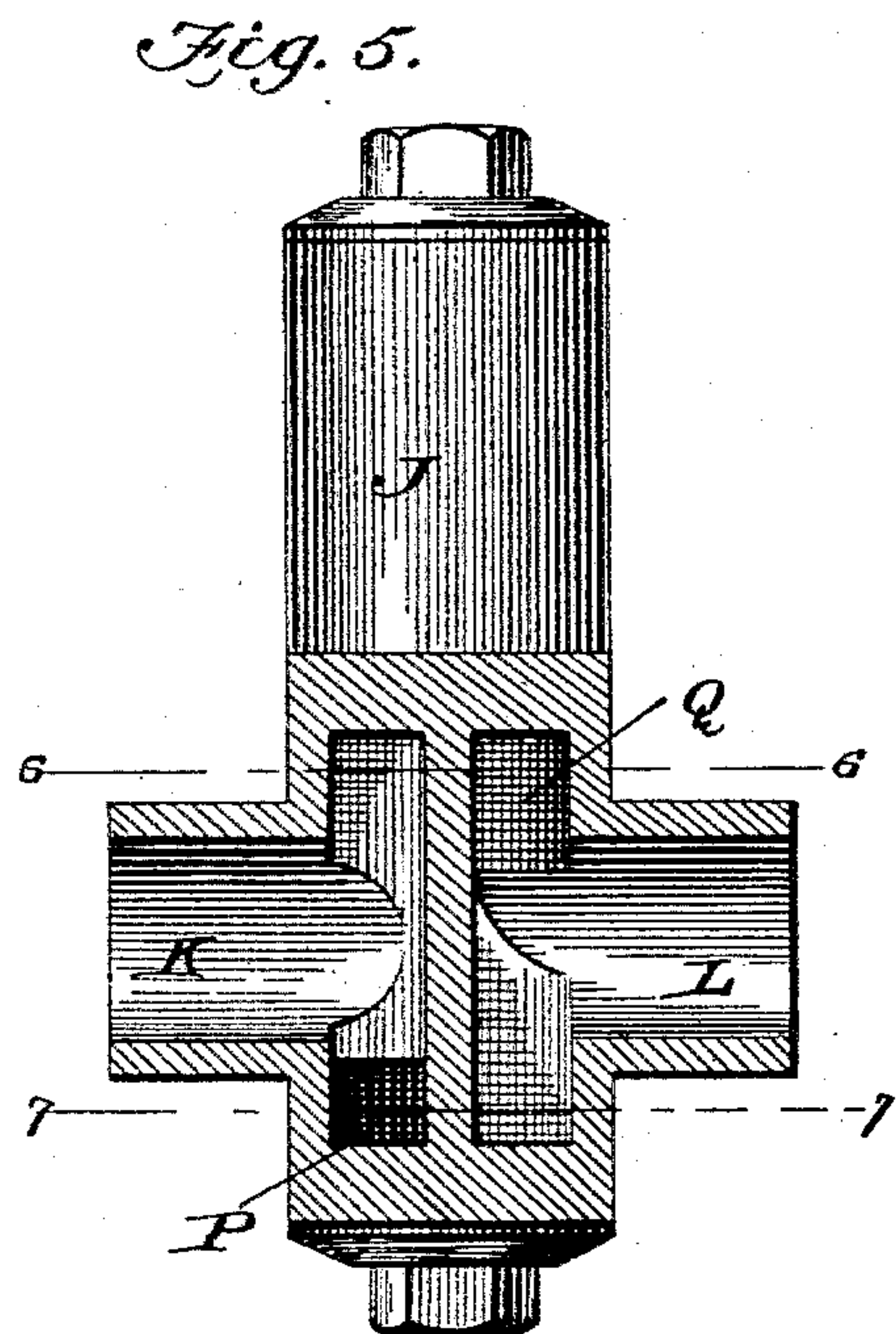
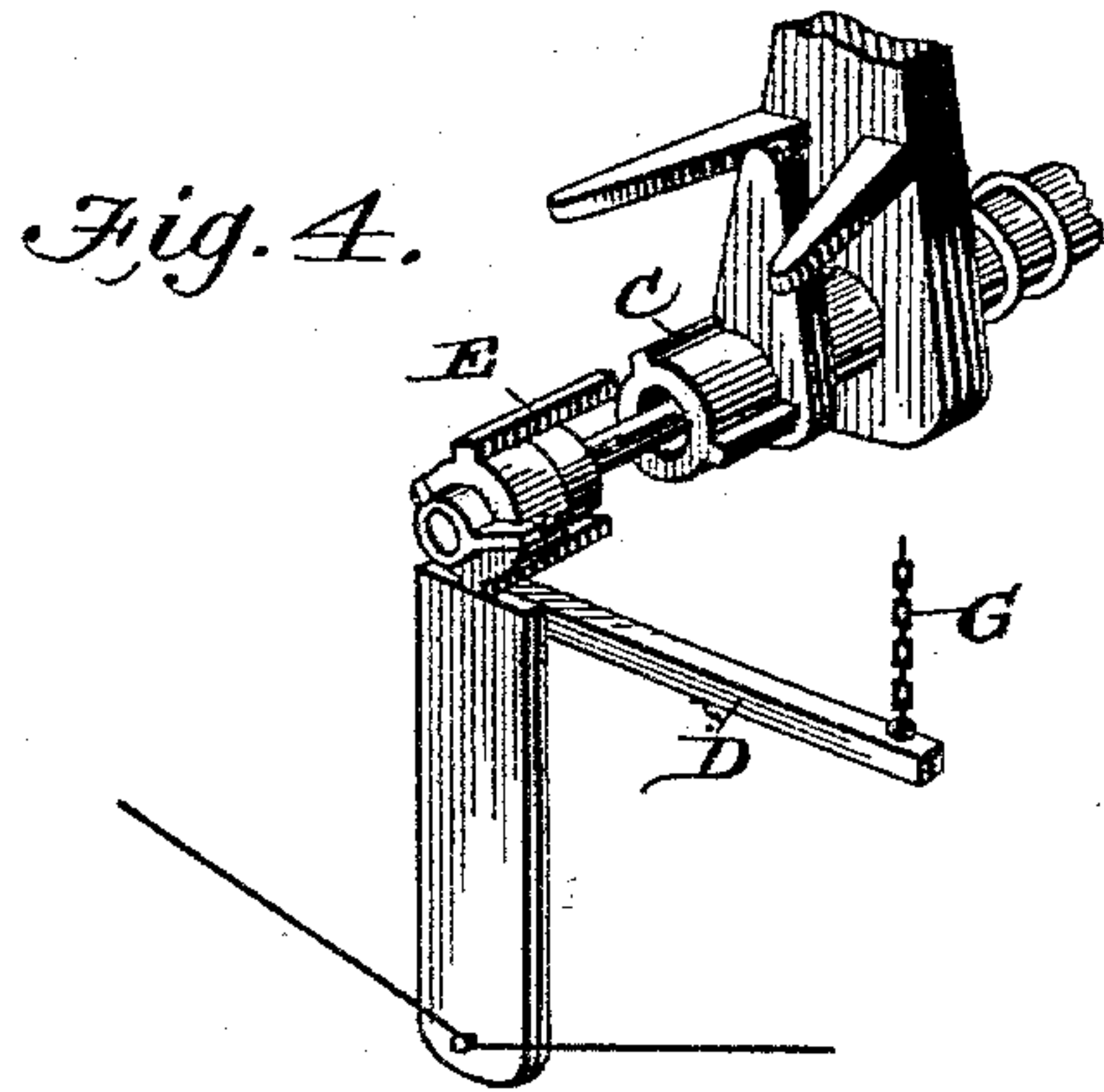
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# UNITED STATES PATENT OFFICE.

WILLIAM A. HARRIS AND BENJAMIN S. H. HARRIS, OF GREENVILLE,  
SOUTH CAROLINA.

## AIR-BRAKE COUPLING.

SPECIFICATION forming part of Letters Patent No. 571,662, dated November 17, 1896.

Application filed February 28, 1896. Serial No. 581,127. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM A. HARRIS and BENJAMIN S. H. HARRIS, of Greenville, in the county of Greenville and State of South Carolina, have invented a new and useful Improvement in Air-Brake Couplings, of which the following is a specification.

This invention is an improvement in air-brake couplings, and particularly in that class of such inventions represented by the apparatus covered by our former patent, No. 544,253, granted August 6, 1895. The present invention is an improvement upon the devices covered by said patent, and relates especially to the means for operating the shifting regulating devices, and which serve to so set such regulating devices that the valve of the coupling on the end of the car nearest the engine will be held open if the car or cars be broken from the train, so the brakes on such broken-off car or cars will be set, as will be readily understood. In the present invention we operate such shifting regulating devices by air-pressure; and the invention consists, broadly, in the provision, in connection with such shifting regulating devices, of a fluid-operated piston by which to actuate the same, and specifically in the novel construction and combination of parts, as will be hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a side view, partly in section, showing our improved coupling. Fig. 2 is a detail transverse section. Fig. 3 is a detail view showing the main and by-pass cylinders in sectional perspective. Fig. 4 is a detail perspective view showing the restraining devices. Fig. 5 is a sectional view on about line 5 5, Fig. 6. Fig. 6 is a section on about line 6 6 of Fig. 5. Fig. 7 is a section on about line 7 7, Fig. 5; and Fig. 8 is a detail view illustrating a slight modification, as presently described.

In our former invention above referred to the coupling A had a valve B and springs and coacting devices by which to close such valve when unrestrained, and we provide shifting devices by which to restrain the said valve-closing devices. Such shifting devices included a stop C on one member of telescop-

ing or shifting parts and a swinging arm D on the other member, such arm D having a lug or portion E, which might be brought into alinement with the stop C, and so prevent the telescoping members from moving together to effect a closure of the valve B, or the part E may be set to move alongside the stop C, and so permit the valve to close. Corresponding parts are employed in our present improvement, and apart from or except with respect to the means employed for operating the shifting regulating device the apparatus, as shown in our former patent, may be duplicated herein and therefore needs no detailed description.

In our former patent vanes or wind-sails were employed to actuate the shifting regulating device, which in certain adjustments operated as a restraining means to prevent the operation of the valve-closing mechanism. In our present invention we employ a fluid-operated piston and intermediate devices, whereby a certain movement of such piston may restrain the operation of the valve-closing devices. In the construction shown and as preferred the piston F has its stem *f* connected by a chain G, or it may be in other suitable manner with the arm D, so that an upward movement of the piston F will adjust the lug E into alinement with the stop C, so that if the couplings should become detached the said lug E by engaging the stop C will hold valve B open and so set the brakes.

In the construction shown the piston-cylinder is connected with and receives its pressure from the pipe H, which is shown as the signal-pipe, but manifestly this might be a separate pipe, as, for instance, on freight-trains. It is preferred to use in connection with the cylinder I what for convenience of reference we term the "by-pass" cylinder J, and it is also preferred to form these cylinders I and J together and to construct and connect them in the manner which will now be described.

Between the cylinders I and J are provided the couplings or connections K and L to which the sections of pipe H are joined. The connection K faces the adjacent end of the car—that is to say, the end of the car having the



coupling-valve to be controlled by the fluid-operated piston—while the coupling L faces in the opposite direction.

In the cylinder I we support the piston F, whose stem  $f$  projects and connects with the regulating devices, as before described, and this piston operates above a perforated cross-partition  $f'$  or other suitable stop. Below this stop  $f'$  a port M leads into the cylinder I, such port communicating with the connection or inlet K and serving to admit air-pressure below the piston F when the pressure comes from said inlet K, and also permitting the outlet of air entering from the inlet L through port N in case pressure comes from the other direction. This is effected through the aid of a check preferably in the nature of a piston-check O, operating in the cylinder I, limited in its upward movement by the stop  $f'$  and in its downward movement by a stop, which may be a stem O', as shown, or other suitable construction. This check O slightly exceeds the length of the port M, so that when the check is in its uppermost position the lower end  $m$  of the port is exposed, and when the check is in its lowermost position the upper end  $m'$  of said port is exposed. Now while the port M is preferably open between its ends  $m$   $m'$ , as indicated in dotted lines, Fig. 3, it should be understood that if closed between said ends, as indicated in Fig. 8, the operation presently described might be effected. In the operation of the described construction the check O, being in its down position resting on the stop O', if pressure enters from the port N it will force the check O up against the stop  $f'$  and prevent the pressure from reaching the piston F, and when the check reaches its uppermost position it will expose the lower end  $m$  of the port M, so the air may pass out through such port and so form a direct passage from front to rear. If, however, the air comes in through port M, it will pass in above the check O and force the piston F upward, the pressure maintaining such piston up. When the air comes in through port M and above the check O, the latter will be forced down, so that the air cannot pass back from the connection K to the connection L through the cylinder I. To permit such passage of the air backward during the operation of the signaling, we provide a by-pass, as will be presently described.

The cylinder J has at its lower end a port P in communication with the connection or inlet K and also a port Q, which communicates with the connection L. Between these ports P and Q is arranged a stop R, preferably a perforated partition, as shown. In this cylinder above the partition R we provide a piston S, having heads  $S'$   $S^2$ . In this cylinder J if the air enters from connection K it forces the piston S up and passes out through the port Q to the connection L. Thus we furnish a passage from K through ports P and Q to L in one direction and from connection L through ports N and M to connec-

tion K, so that the air may pass back and forth through the signal-pipe without destroying the proper operation of the piston F, which regulates the setting of the brakes by restraining the movement of the brake-closing devices. Thus it will be seen the air may play freely in one direction through one cylinder and in the opposite direction through the other cylinder, and we provide in both cylinders checking devices—that is to say, the check O and the piston S, which is practically a check, as if the air comes from connection L it will close the piston-check  $S^2$  down in such manner as to prevent the passage of air out through port P, whence it might pass to operate the piston F when not desired.

In operation the pressure back from the locomotive will set the piston F up in position to adjust the restraining devices to position to hold the valve from closing, so the brake will be set. It should be noticed that this operation is only effected in those of the cylinders I of each car which are nearest the locomotive, so that if such car be broken from the train the brake will be set thereon, while the car left coupled with the locomotive will not be braked as its coupling-valve will be permitted to close.

Apart from the advantages incident to our present invention because it is a positively-operating device to control the valves, it is desirable over the wind-operated devices of our former patent, because the present device accurately operates the restraining devices whether the train be on a level, ascending or descending a grade, and without being affected by the speed of the train, whereas in the wind-regulated device if the motion of the train was not sufficient to create the necessary draft or if the train were slowly ascending a grade and a car should break loose the brakes might not be set thereon.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. An air-brake coupling provided with an automatically-operating valve and with a shifting regulating device, combined with a fluid-operated piston by which to actuate such device substantially as and for the purposes set forth.

2. The combination of an air-brake coupling having a valve, devices by which such valve may be automatically closed, restraining devices which in certain adjustments may prevent the automatic closing of such valve, and a fluid-operated piston by which to set the restraining devices to such adjustment substantially as set forth.

3. The combination of an air-brake coupling having a valve, devices by which such valve may be automatically closed, a fluid-operated piston, and intermediate devices whereby a certain movement of such piston may restrain the operation of the automatic valve-closing devices substantially as set forth.



4. In an air-brake coupling the combination with the valve thereof of devices by which to close the same, restraining devices by which to hold such valve-closing devices from operating, a fluid-operated piston by which to actuate such devices, and the casing for such piston, having a by-pass and ports whereby the fluid may pass in one direction without operating said piston substantially as and for the purposes set forth.

5. An air-brake coupling provided with a valve, valve-closing devices, restraining devices for such valve-closer, and a cylinder having a piston by which to actuate the restraining devices and provided with a by-pass and ports whereby the fluid may pass in one direction without operating said piston substantially as and for the purposes set forth.

6. In an apparatus substantially as described the combination with the cylinder and the piston therein of the check operating in said cylinder below and independently of the piston, ports being provided whereby the actuating fluid may be admitted above or below said check substantially as set forth.

7. In an apparatus substantially as described the combination of the cylinder, the piston therein, the check movable in said cylinder below and independently of the piston, the cylinder being provided with a port alongside the line of movement of the check and stop devices whereby the check in its opposite positions will expose opposite ends of said port substantially as set forth.

8. In an apparatus substantially as described the combination of the main cylinder, the by-pass cylinder and the piston and check in the main cylinder the said cylinders being provided with ports whereby the air may play freely in one direction through one cylinder and in the opposite direction through the other cylinder substantially as set forth.

9. In an apparatus substantially as de-

scribed the combination of the two cylinders and ports and connections whereby air may pass in one direction through one cylinder and in the opposite direction through the other cylinder check devices in both said cylinders for preventing the reverse movement of the air therethrough and a piston in one of said cylinders substantially as set forth.

10. In an apparatus substantially as described the combination of the cylinder I having a stop  $f'$  and ports M and N, the check limited in one direction by the stop  $f'$  a stop for limiting the opposite movement of said check, the cylinder J having ports P and Q and a check in said cylinder J substantially as and for the purposes set forth.

11. In an air-brake coupling the combination of the valve, the carrier members sliding one upon the other, one of said members being provided with a stop, a shifting regulating device upon the other member provided with a portion arranged to engage the stop of the first member, and the fluid-operating piston arranged to actuate said shifting regulating device all substantially as and for the purposes set forth.

12. The combination of an air-brake coupling having a valve, mechanism by which such valve may be automatically closed, a fluid-operated device arranged to restrain the movement of said valve-closing mechanism, a casing inclosing said fluid-operated device and having ports and controlling devices whereby the fluid may pass freely in one direction without affecting the fluid-operating device but will operate said device on the opposite movement substantially as set forth.

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BENJAMIN S. H. HARRIS.

Witnesses:

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