

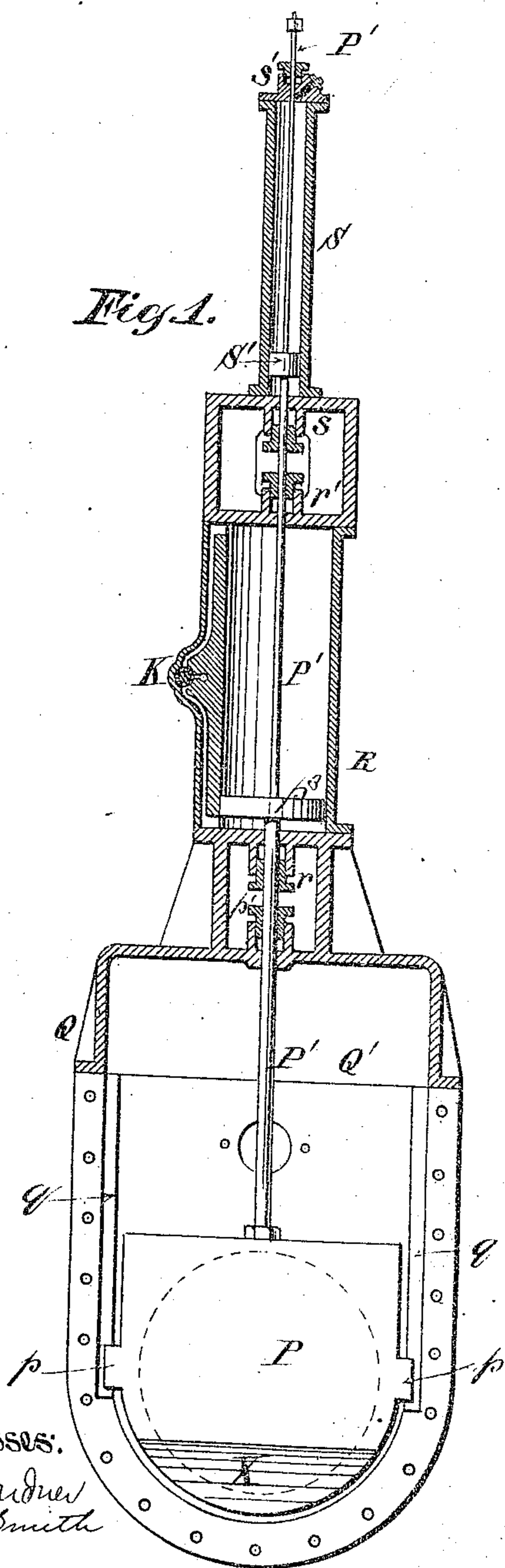
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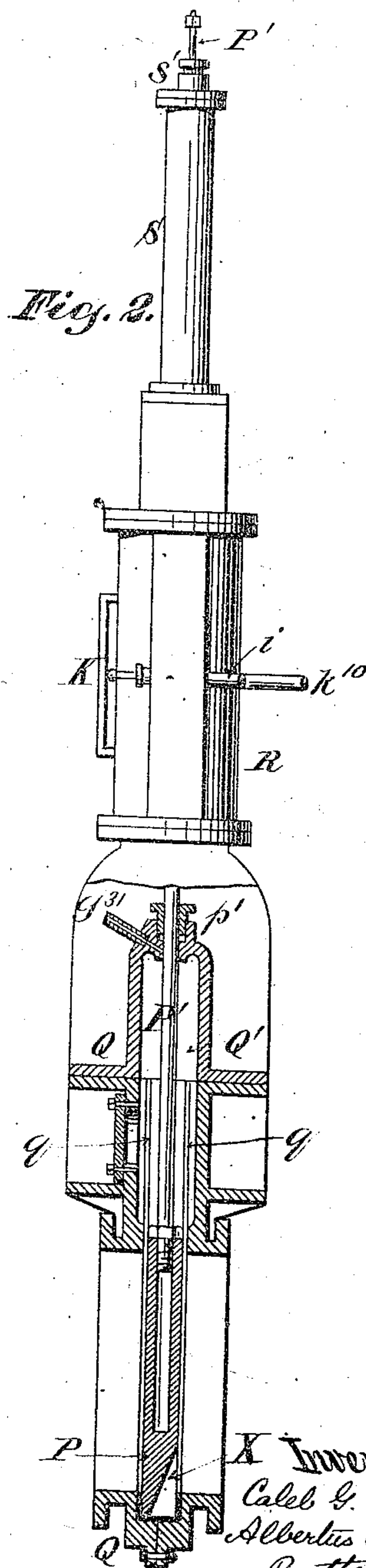
C. G. COLLINS & A. C. HILSINGER.
SLIDING VALVE.

No. 534,360.

Patented Feb. 19, 1895.



Witnesses:
D. W. Gardner
John Smith



X Inventors:
Caleb G. Collins
Albertus C. Hilsinger
By their Attorney
George William Smith

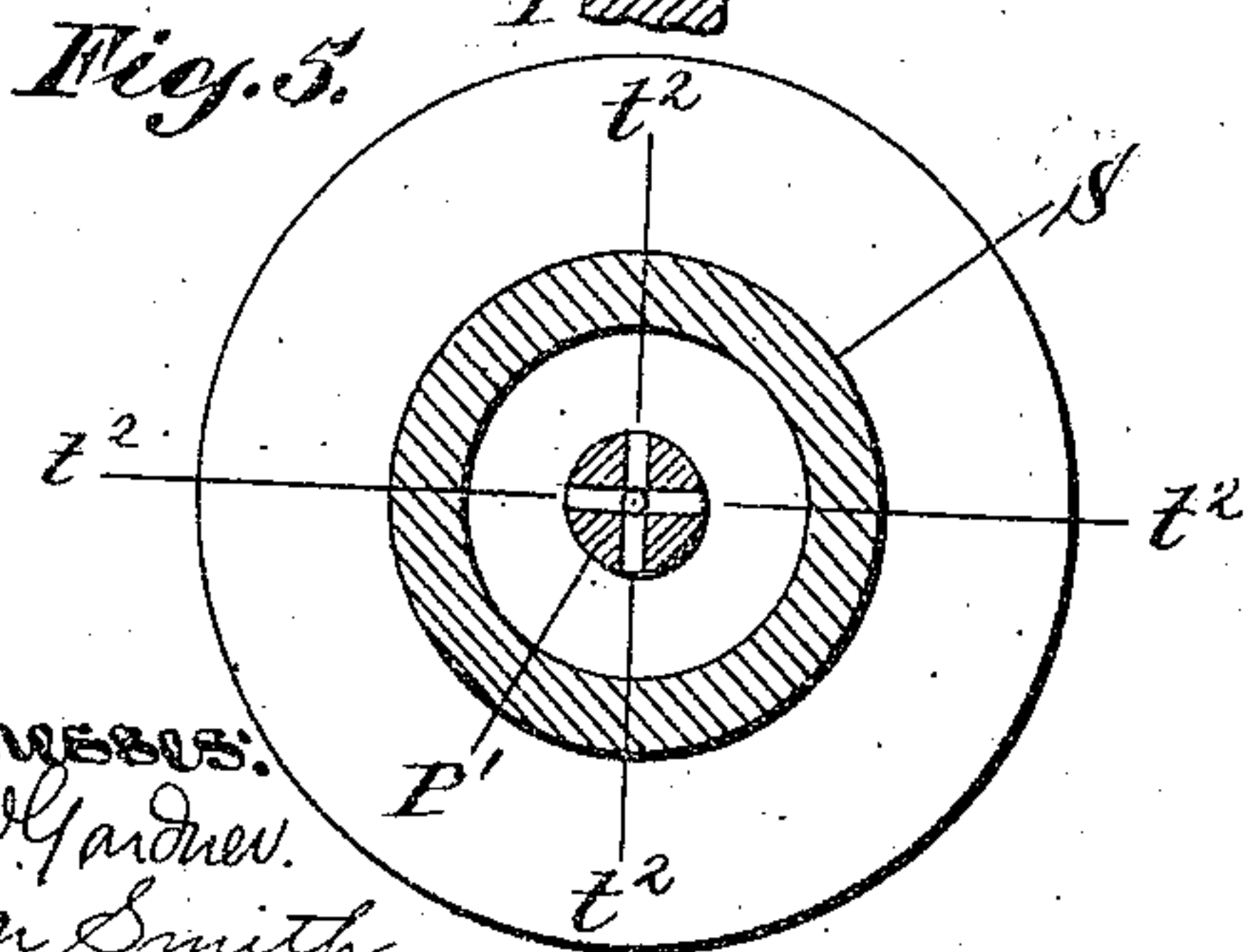
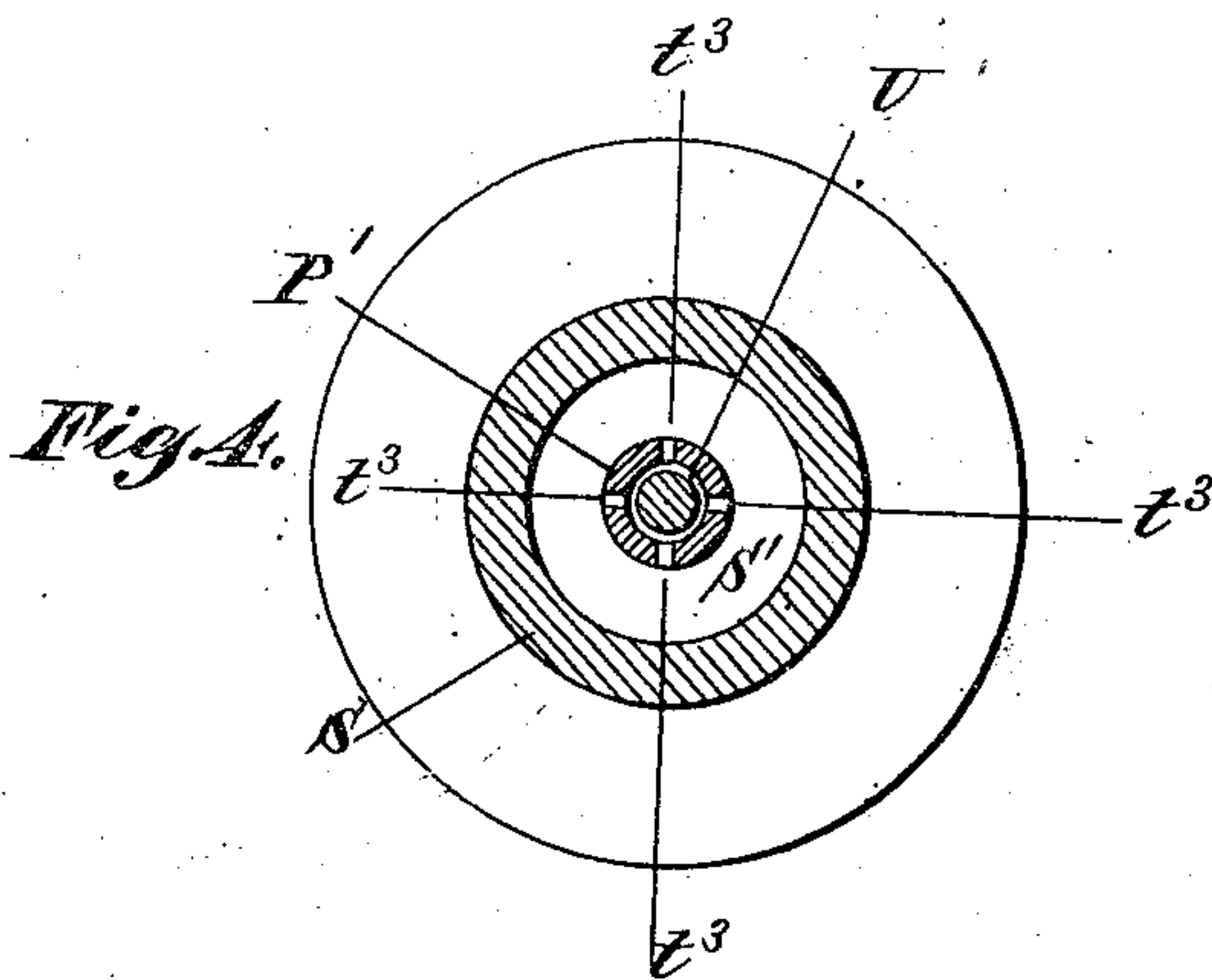
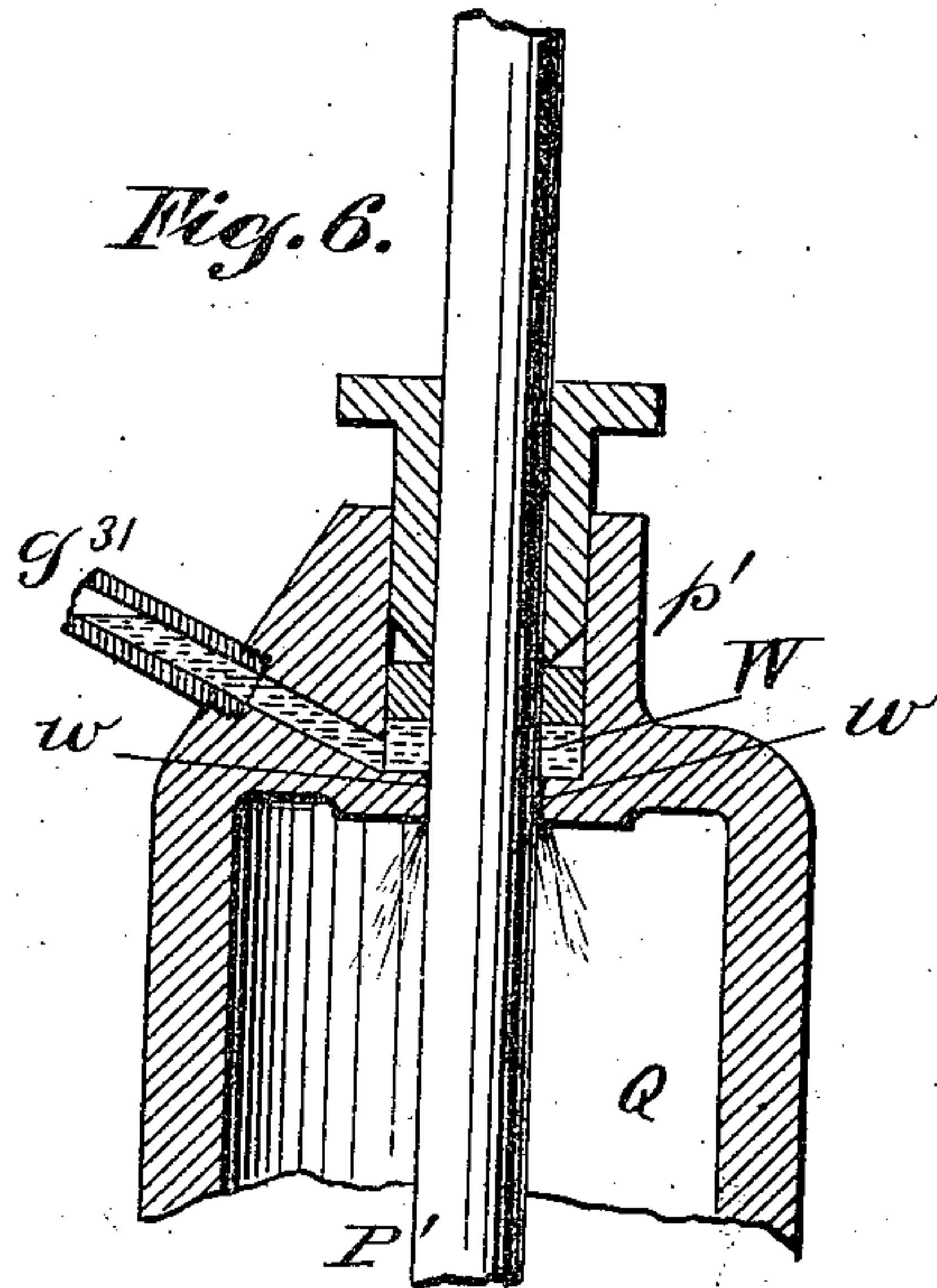
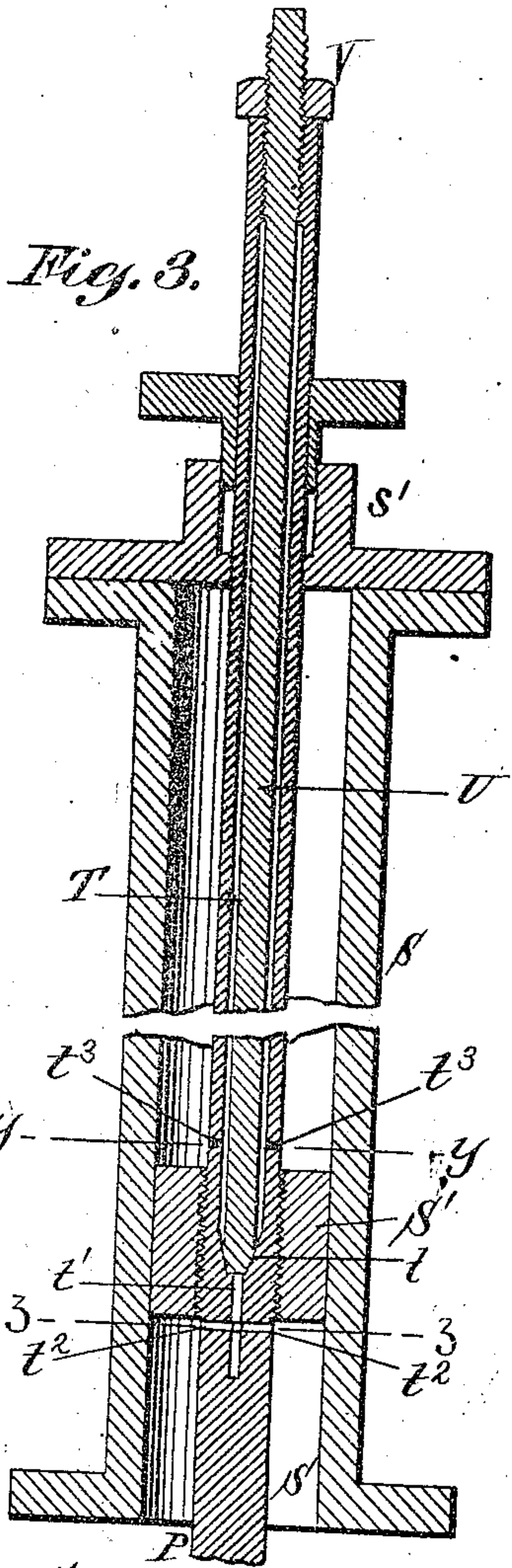
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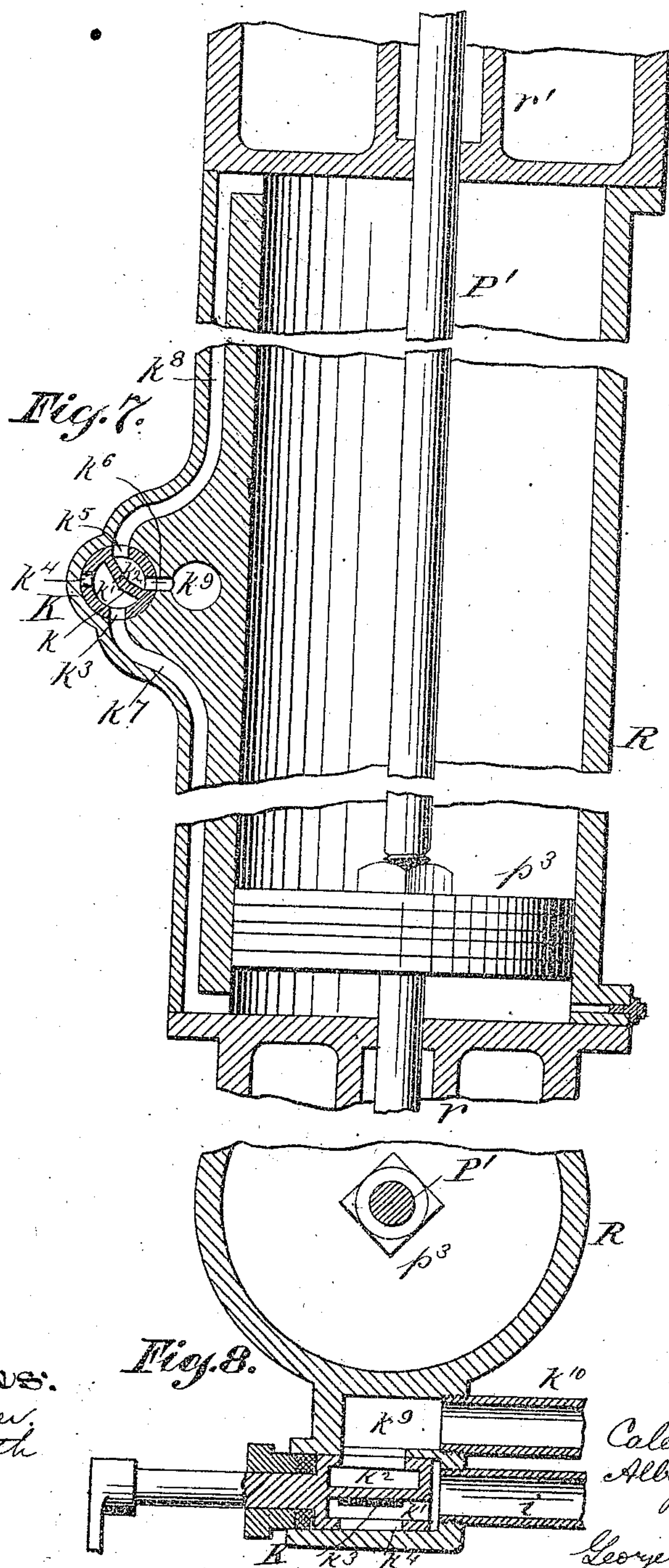
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2 Pages - Sheet 3.

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UNITED STATES PATENT OFFICE.

CALEB G. COLLINS, OF WOODSBURG, AND ALBERTUS C. HILSINGER, OF
KILLAWOG, ASSIGNORS TO C. AMORY STEVENS, OF NEW YORK, N. Y.

SLIDING VALVE.

SPECIFICATION forming part of Letters Patent No. 534,360, dated February 19, 1895.

Application filed December 24, 1894. Serial No. 532,879. (No model.)

To all whom it may concern:

Be it known that we, CALEB G. COLLINS, of Woodsburg, in the county of Queens, and ALBERTUS C. HILSINGER, of Killawog, county of Broome, and State of New York, citizens of the United States, have invented certain new and useful Improvements in Sliding Valves, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

Our improvements, though applicable to sliding or gate valves for various uses, are designed more especially for use in connection with vacuum apparatus used in transferring dredged or excavated spoil; and the invention consists in the special construction and arrangement of parts herein set forth.

In the accompanying drawings, Figure 1, is a sectional elevation of one of our gate valves; Fig. 2, a sectional elevation taken at right angles to Fig. 1. Fig. 3, is a central vertical section of the upper portion of one of our gate valves showing the means for governing the movement of the same. Fig. 4, is a transverse section upon plane of line *y, y*, Fig. 3; Fig. 5, a similar view upon plane of line *z, z*, Fig. 3. Fig. 6, is a sectional detail illustrating the means for keeping the valve rod and packing free from grit, &c.; Fig. 7, a partial section of the steam cylinder throttle valve, and connections; Fig. 8, a sectional view of the throttle valve.

The valve consists of the sliding gate *P*, guided by lugs *p*, resting between parallel ways *q, q*, formed in the casing *Q*, of the valve, which casing also incloses the compartment *Q'*, into which the gate *P*, is retracted when the valve is opened.

The valve rod *P'*, extends through suitable packing boxes *p'*, and *r*, into the steam cylinder *R*, where it has secured to it the piston *p^s*. Extending beyond the piston the valve rod *P'*, passes through the steam cylinder *R*, and through suitable packing boxes *r'*, and *s*, to and through a cylinder *S*, of nearly equal length but of less diameter than the steam cylinder *R*. The valve rod *P'*, passes out of the upper end of the cylinder *S*, through a suitable packing *S'*. The cylinder *S*, is filled with oil or other liquid which has to pass from

one side to the other of the piston *s'*, secured to the valve stem *P*, and the speed of this flow of liquid regulates the speed with which the gate opens or closes under the pressure of steam on the piston *p^s*, in the steam cylinder *R*. In other words the necessary displacement of the liquid in the cylinder *S*, retards and controls the action of the steam in the steam cylinder *R*, in such manner that all jar and violence is avoided. It is thus obvious that by regulating the flow of the liquid in the cylinder from one side of the piston *S'*, to the other we can govern accurately the speed of the piston *p*, rod *P'*, and valve *P*, and we accomplish this adjustment in a novel manner.

By reference to Figs. 3, 4, and 5, it will be seen that the upper end of the valve rod is hollow, forming a long cylindrical chamber *T*, the lower end of which terminates in a conical valve seat *t*, from which a narrow passage *t'*, extends downward a short distance to where it is intersected by lateral passages *t²*, opening into the liquid chamber *S*, below the piston *S'*. The valve rod *P'*, where it forms the walls of the chamber *T*, is formed with perforations *t³*, *t³*, shown in Figs. 4 and 5, such openings being above the piston *S'*. The valve consists of a long stem or rod *U*, the lower end of which is made conical to fit the valve seat *t*, and the upper end of which is formed with a male screw thread which engages with a female screw thread formed in the hollow upper extremity of the valve rod. A jam nut *V*, screws upon the projecting end of the valve stem *U*, and locks the required adjustment of the conical end of the valve with relation to the valve seat *t*. By increasing or diminishing the space between the conical end of the valve stem *U*, and its seat *t*, the flow of the liquid from one side of the piston to the other, under pressure exerted by the action of the steam upon either side of the piston *p^s*, in the steam cylinder *R*, can be regulated with accuracy, and it is to be noted that this adjustment can be effected entirely from the exterior of the device by simply loosening the jam nut *V*, turning the stem *U*, in one direction or the other by means of a wrench or other device, and again setting up the jam nut.

The gate P, is raised and lowered by admitting steam to the steam cylinder R, on one side or the other of the piston p^3 , in the usual manner, the exhaust steam escaping from the opposite side of the piston. This is effected by means of the throttle valve K, which is divided longitudinally by the partition k . The two chambers k^1, k^2 , thus formed each have two ports k^3, k^4 , and k^5, k^6 . The chamber k^1 , opens at the end of the valve into the steam supply pipe i , so that when the port k^3 , is brought into coincidence with the passage k^5 , in the side wall of the cylinder R, steam will be admitted to the under side of the piston, while simultaneously, the port k^4 , being in coincidence with the passage k^6 , the exhaust steam will escape through the chamber k^2 , and port k^6 , into the discharge chamber k^3 , and out through the pipe k^{10} , as illustrated by the position of the parts in Figs. 7 and 8. In like manner when it is desired to close the gate valve P, throttle valve K, is turned until the port k^4 , coincides with the passage k^3 , admitting steam thereto, while the port k^6 , now being in coincidence with the passage k^5 , and the port k^5 with the discharge chamber k^3 , the exhaust steam is free to escape from above the piston p^3 .

In closing the vacuum chamber steam gate valves as heretofore constructed difficulty has frequently been encountered by reason of the lower edge of the valves encountering stones and other comparatively small objects that pass over with the spoil, the rectangular edges of the valve affording a broad bearing and holding the obstruction against dislodgement until the throttle valve is reversed, as must necessarily be done before that particular valve can be closed and the other opened. We overcome this difficulty to a great extent by forming the lower edges of each gate valve at an angle, so that it is wedge-shaped in cross section, substantially as shown at X, Fig. 2. As a result solid material is thrust aside by the edge of the descending valve and the valve clears its own passage to its seat, a feature of no small importance when rapidity and certainty of manipulation are essential.

Owing to the gritty, slimy nature of the spoil passing through the apparatus much difficulty has heretofore been experienced by reason of the grit carried up by the valve rod into the stuffing boxes, resulting in undue wear and leakage. In order to remedy this difficulty, we form the first packing box p^1 , with an annular water chamber or jacket W, to which water is supplied under pressure by the pipe g^{31} , shown in Figs. 2 and 6. The an-

nular water jacket itself is shown on an enlarged scale in Fig. 6. Under these conditions the water presses its way outward and downward between the edges of the flanges w , and the periphery of the valve rod, with sufficient force and in sufficient quantity to wash away from the surface of the valve rod all dirt and grit before it can enter the box with the rod.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a gate valve substantially such as shown the combination of the casing Q, formed with the compartment Q', and the parallel ways q, q ; the valve P, in said compartment Q', held against lateral movement by the ways q, q , and having the valve rod P'; the piston p^3 , on said valve rod P', situated in the steam cylinder R; said steam cylinder R, and the throttle valve K for controlling the steam supply and exhaust of said cylinder R; the piston S', upon the valve stem P', situated in the liquid chamber S, and formed with a passage for the flow of liquid through the piston from one side thereof to the other; the adjustable valve U for regulating the flow of liquid through the piston S'; and the chamber S sealed to confine a body of liquid therein substantially in the manner and for the purpose described.

2. In a gate valve substantially such as shown, the combination of the casing Q, formed with the compartment Q', and the parallel ways q, q ; the valve P in said compartment Q', held against lateral movement by the ways q, q ; and having the valve rod P'; the piston p^3 , on said valve rod P', situated in the steam cylinder R; said steam cylinder R and the throttle valve K for controlling the steam supply and exhaust of said cylinder R; the piston S', upon the valve stem P', situated in the liquid chamber S, and formed with a passage for the flow of liquid through said piston from one side thereof to the other; the adjustable valve rod U for regulating the flow of liquid through the piston S', screwing into the hollow upper end of the valve stem P'; the lock nut V for securing the valve rod U in a prescribed position; and the chamber S sealed to confine a body of liquid therein, substantially in the manner and for the purpose described.

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