

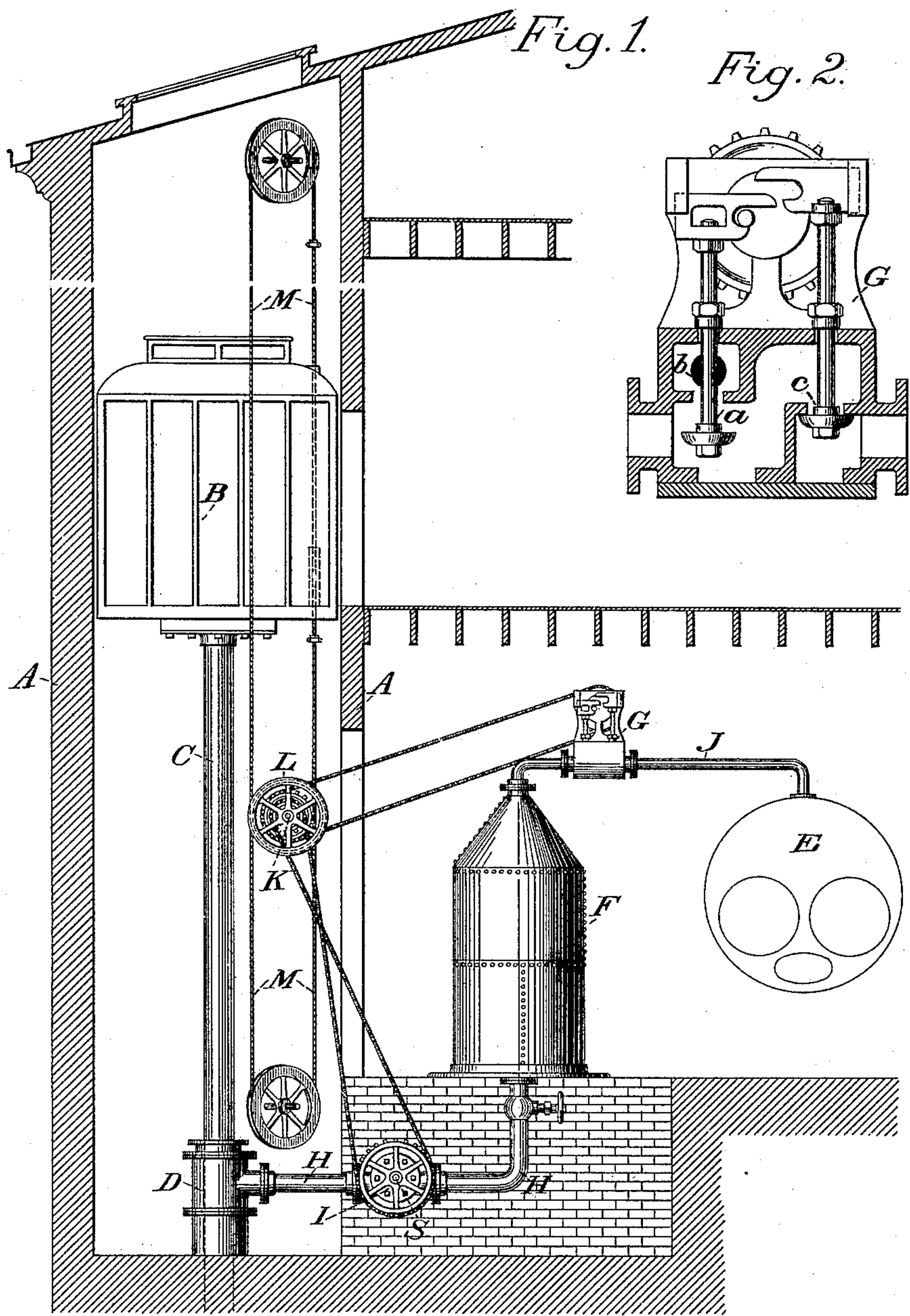
(No Model.)

2 Sheets—Sheet 1.

C. I. HALL.
VALVE.

No. 465,095.

Patented Dec. 15, 1891.



Witnesses:

E. A. Brandau

W. D. Bent, Jr.

Inventor:

C. I. Hall
By his atty
John Richards

(No Model.)

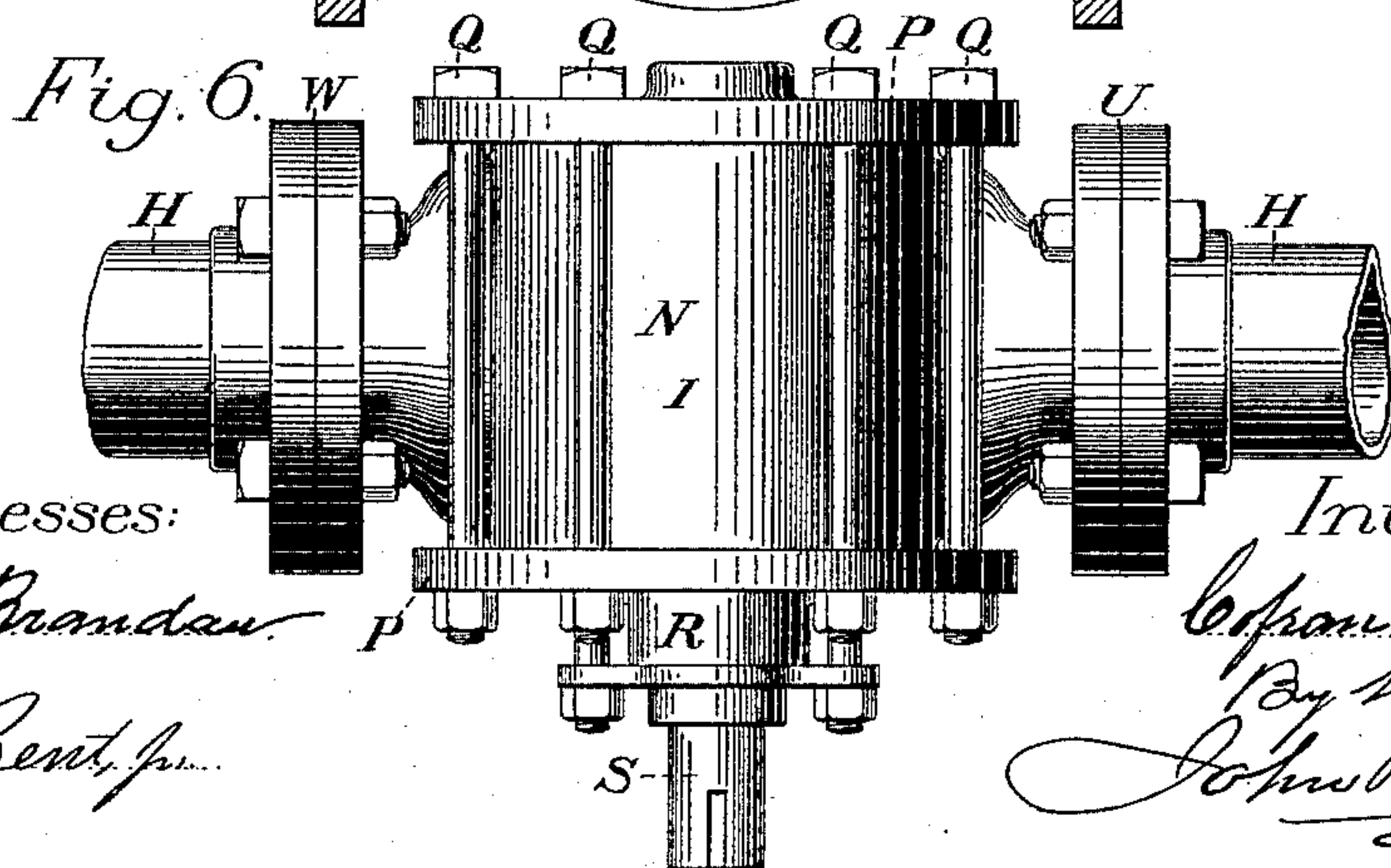
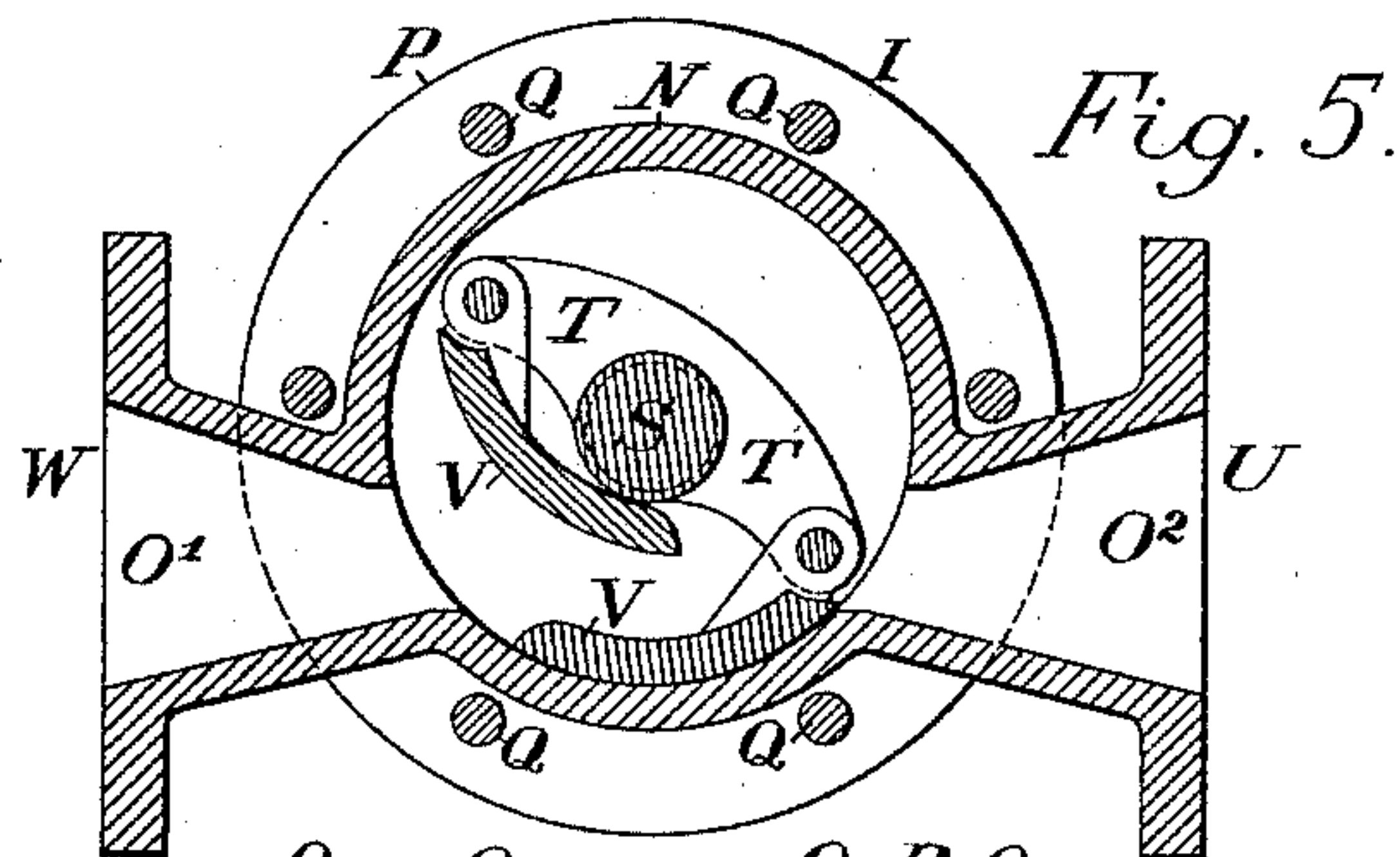
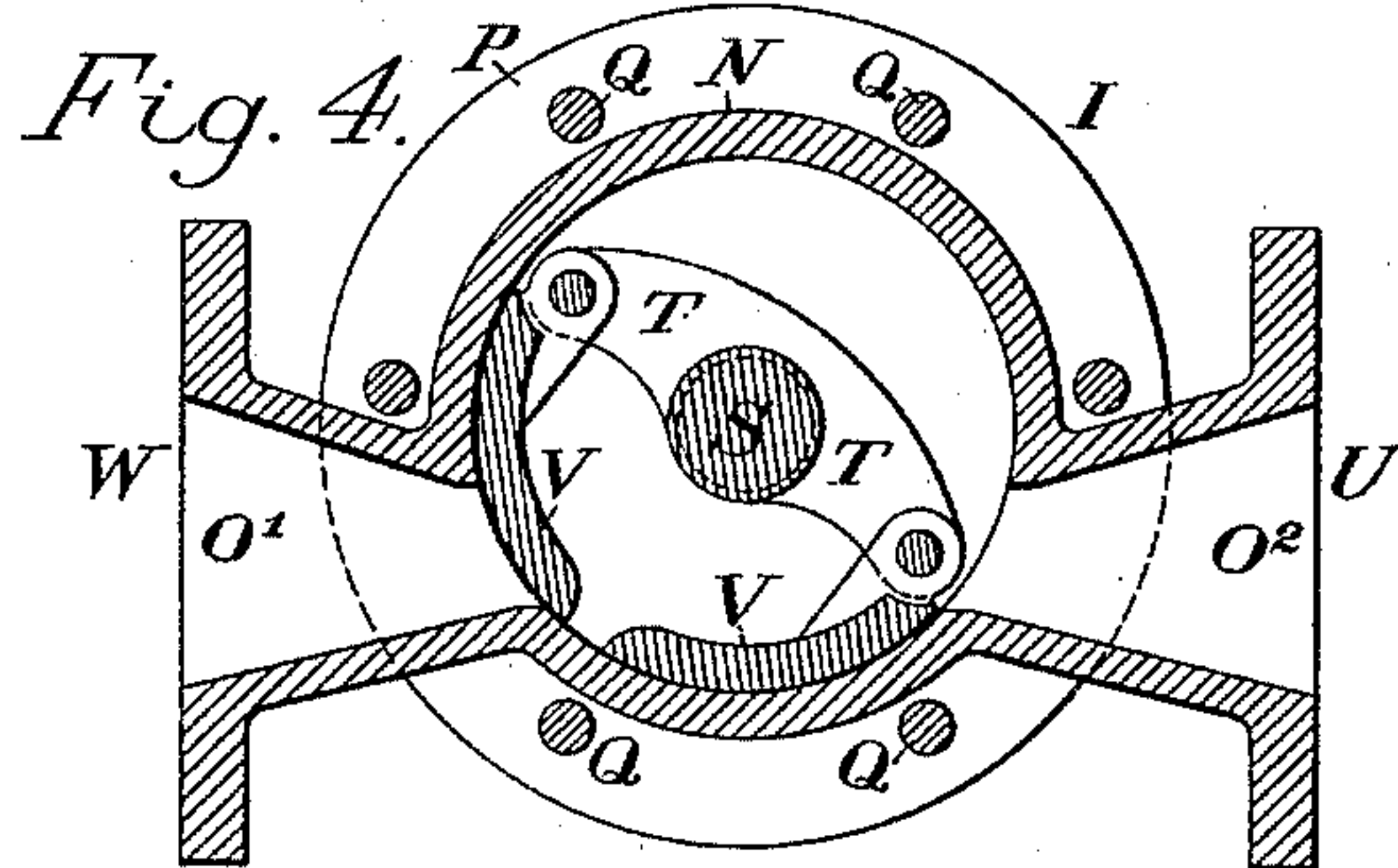
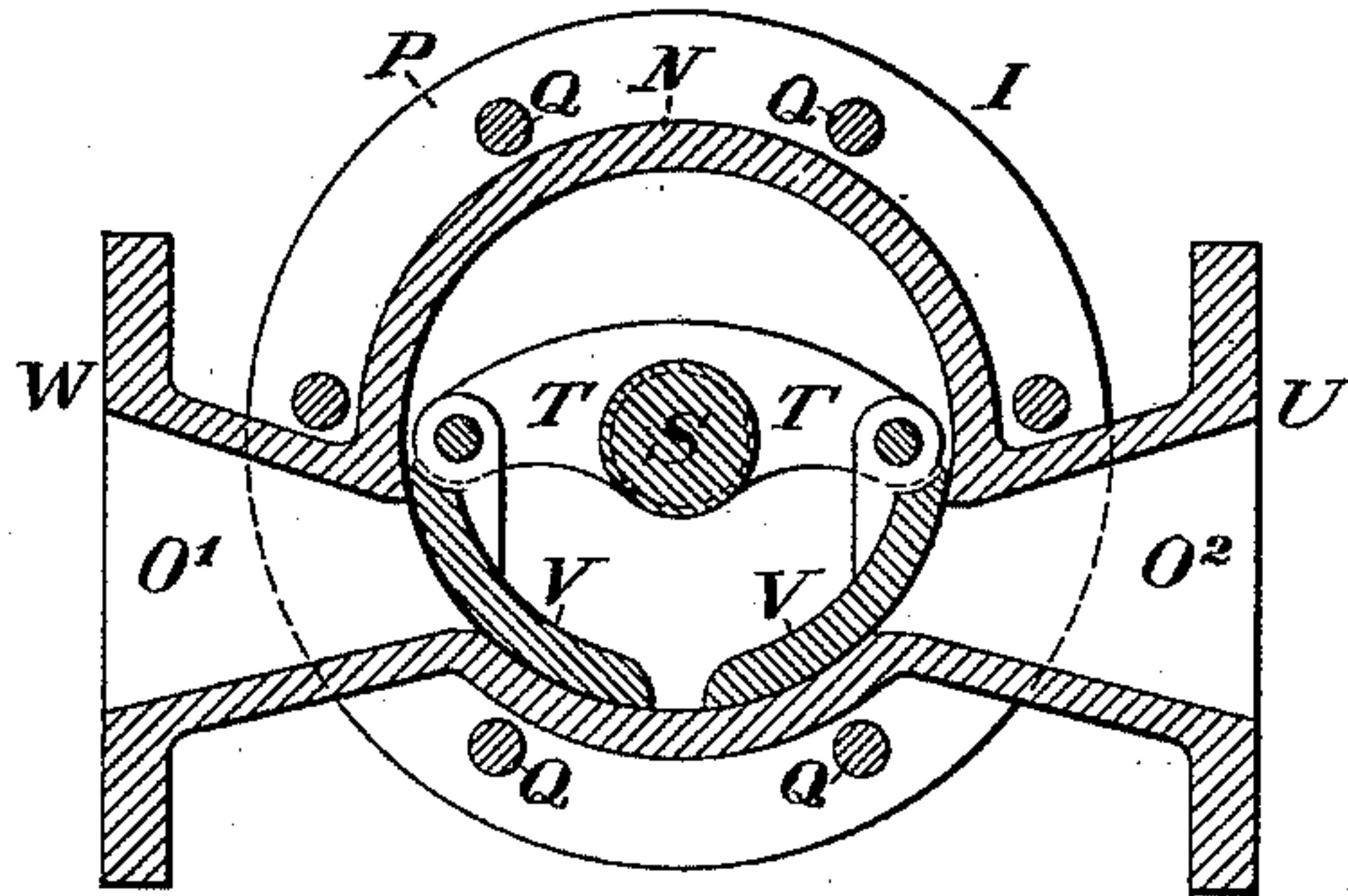
2 Sheets—Sheet 2.

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Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

COFRAN I. HALL, OF SAN FRANCISCO, CALIFORNIA.

VALVE.

SPECIFICATION forming part of Letters Patent No. 465,095, dated December 15, 1891.

Application filed May 2, 1891. Serial No. 391,381. (No model.)

To all whom it may concern:

Be it known that I, COFRAN I. HALL, a citizen of the United States, residing at San Francisco, county of San Francisco, and State of California, have invented certain Improvements in Valves; and I hereby declare the following description and drawings to be a full and true specification of the same.

My invention relates to valves applicable to elevators for raising or lowering passengers or freight, operated by the pressure of air, steam, or other elastic fluid, applied through the medium of hydraulic apparatus to pistons or rams; also applicable in any case where elastic and varying pressures are to be dealt with, acting either as check or stop valve.

My present invention is an improvement on a valve having similar functions and described in Letters Patent of the United States No. 343,644, granted to me December 30, 1890, for elevator-valve mechanism, and is also in some respects a modification, with different functions, of an invention for which I have made application for Letters Patent, Serial No. 391,382, filed May 2, 1891, for improvement in valves for hydraulic elevators.

In the case of an elevator operated by an elastic fluid—such as is here chosen to illustrate an application of my invention—the action of valves controlling the flow of such fluid must depend in some measure on the weight of the load raised and also the velocity at which it is moved. If hydraulic apparatus is interposed between the rams or pistons and the elastic fluid, this irregularity of range and movement of the cage, due to a uniform opening and closing of the valves, will be lessened, but not avoided. To control this irregularity of movement and range of the ram or cage when two sets of common valves are employed, having simultaneous action for both the air or steam, and the water, such valves will produce exact movement of the pistons, rams, or cages so long as the resistance or load is uniform. If, however, when the valves are closed, the load upon the elevator is increased or diminished and the valves again opened, the cage will suddenly rise or descend until the new load is balanced by the pressure last employed, the steam or air expanding or yielding accordingly. My present invention pre-

vents such false movement caused by employing the pressure of an elastic fluid by so controlling the flow of the water to and from the pistons or rams that no sudden or false movement can occur, the valve being so arranged as to permit a free flow in the course of the desired movement of the cage, but closing automatically, as a check-valve, to any reverse movement of the water, or when the retained elastic pressure of the steam or air is not balanced by that in the cylinder of the ram or piston.

The method of constructing and operating my improved valves in connection with a hydro-steam elevator is shown in the drawings herewith, in which—

Figure 1 is a vertical elevation, partially in section, showing a ram-elevator with one of my improved valves attached. Fig. 2 is a longitudinal section through the valves employed to control the flow of steam or air to operate the elevator. Fig. 3 is a longitudinal section through one of my improved valves, showing it closed to flow in either direction. Fig. 4 is another section of the valve in the same plane, but closed to flow in one direction. Fig. 5 is also a section of the same valve, showing its position when the flow of water is reversed, and the valve opens automatically, independent of its actuating mechanism. Fig. 6 is an external plan view, on top, of the complete valve.

The casing, stem, and various parts of the valve are analogous to those in the one shown in my application for Letters Patent, Serial No. 391,382, filed May 2, 1891, and before referred to; but there is the difference that in the previous case the valve was wide open and free to a flow either way when in a neutral or central position, while the present valve is shut or closed to flow either way when in a central or neutral position, so its functions and purposes are wholly different, and the present one being applicable in any case where a fluid is to be dealt with at varying pressures.

Referring to Fig. 1 of the drawings, which shows a direct ram-elevator with one of my improved valves attached, A A are the walls of a well in which the cage B moves up and down by means of the ram or piston C, which passes down into a cylinder D in the usual

manner. This piston or ram C is raised by water forced in through the pipe H from the tank or receiver F, passing on its way through the valve at I, which valve corresponds to Figs. 3, 4, 5, and 6 of the drawings, to be hereinafter more fully described. Steam being the most common source for initial power in elevators thus operated, I have indicated a steam-boiler by the diagram E, connected to a tank or receiver F, the latter made large enough to contain a greater quantity of water than is required to fill the cylinder D or to replace the ram C when the cage B is at its extreme upper stroke, so that some water will remain at the bottom and thus prevent the flow of steam or air through the pipe H or the valve I. This receiver F is connected to the boiler E by means of the pipe J, and in this pipe, to control the flow of steam, is placed the valve G. (Shown also in the enlarged view, Fig. 2.)

The two valves I and G are connected by chain-gearing to wheels on the shaft K, as shown in the drawings, Fig. 1. On the end of the shaft K is a wheel L, to which is connected the rope M, one strand of which passes inside the cage B, as shown by dotted lines. The wheel L can thus be turned in either direction by an attendant in the cage B, so the wheel L and those on the valves I and G are all turned simultaneously in either direction as the cage B is required to ascend, descend, or stop at any point. If it is required to ascend, connection is opened between the steam-boiler E and the tank or receiver F, and at the same time the valve I is opened, so as to admit water from the receiver F to the cylinder D. If it is required to descend, the wheel L is turned in the opposite direction, opening the valve I between the cylinder D and the receiver F, also opening the valve G, not to the boiler E, but to the atmosphere through port *b*, so the steam from the receiver F may escape and the water in the cylinder D be forced back through the pipe H into the receiver F by the gravity of the ram C and the cage B. During the descending movement the valve G is in the position shown in Fig. 2, the steam from the receiver F escaping through the valve *a* and out at the exhaust or waste pipe *b*.

Referring, further, to Fig. 2, when the ram C and the cage B are to ascend the valve *a* is closed and the one *c* is opened, so as to allow free communication from the boiler E to the receiver F.

The construction of this valve and its method of operating having been fully explained in my Letters Patent before referred to, No. 443,644, dated December 30, 1890, it will not be necessary to repeal the description here.

In respect to the valve I, forming my present invention, it will be understood that if this were merely a stop-valve and the pressure of steam in the receiver F remained uniform during the intervals of stopping and starting, then, on opening the valve I the

pressure in the cylinder D would be nearly the same as that in the receiver F, and in proportion to the resistance or load in the cage B when the valves were closed. If, however, during the interval of rest the load on the cage B is increased or diminished, as it commonly is at the floors or landings, then when the valve I is opened the ram C and cage B will be suddenly forced up or will suddenly descend, accordingly as the load is changed, until the pressures in the cylinder D and the receiver F are balanced, and are in proportion to the new or changed load on the cage B. To obviate this impediment to the combined use of an elastic and an inelastic fluid for operating the ram C, I employ my improved valve, constructed as shown in Figs. 3 to 6 of the drawings. The outer shell or a main casing N is cylindrical in form, with two nozzles or ports O' and O² cast thereon. The ends of the casing N are covered by the plates P, held by through-bolts Q, so the interior parts can be readily removed at either end of the casing N. One of the plates P has a packing-gland R to receive the stem S, as shown in the plan, Fig. 6. The stem S has formed upon it lugs T, to which are attached the swinging valves or plates V in the manner shown in the sections, Figs. 3, 4, and 5.

The lugs T project in opposite directions on opposite sides of the stem S and lie in radial positions, having their outer ends contiguous to the surrounding wall of the valve-casing, and the swinging plates, valves, or covers V are preferably curved in arcs concentric with the cylindrical casing in order that there may be a close connection and an intimate relative operation of the several parts, so as to accomplish the results in view with perfection and accuracy.

When the valve is in its central or neutral position, the plates V cover both the ports or nozzles O' and O², as shown in Fig. 3, cutting off the flow of water both ways and acting simply as a stop-valve. Supposing in the case illustrated the valve to be opened to the port O², as shown in Fig. 4, the end W connecting to the receiver F and the end U connecting to the cylinder D, now if the pressure in the cylinder D has been increased by an additional load on the cage B no backflow can occur from U to W, because the swing-plate V covers the port O', as shown, and the cage B cannot move; but as soon as the pressure in the receiver F is sufficient then the valve takes the position shown in Fig. 5, acting as a relief, and the flow begins from W to U or from the receiver F to the cylinder D, and the cage B rises with a steady motion, the same as if no elastic pressure has been employed in its propulsion. In descending, all the operations just described are reversed, and the ram C and cage B move downward with a regular and exact motion.

In the present valve, the movements of the stem S and its connected parts being rotary or oscillating, no actuating mechanism is re-

quired except the wheel L, to which the ropes M connect directly, as shown in Fig. 1.

Although my invention is shown applied to a direct or ram elevator, it will be understood that the operation would be the same if the hydraulic apparatus were applied to any other purpose where accurate movement is required. It is also evident that the valve is applicable in any case where there is a flow of fluids against or from an irregular or varying pressure, preventing a reverse or back flow when there is a rise of pressure on the delivery side, and when in its central or neutral position acting as a stop-valve to flow in either direction.

Having thus explained the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a combined stop and check valve, the combination of a cylindrical valve-casing having ports situated opposite to each other in the wall thereof, substantially as shown, a centrally-located oscillating valve-stem, and the swinging valve plates or covers hinged at their ends to lugs on opposite sides of the shaft, so as to have a free swinging movement between the shaft and the adjacent casing-wall and being adapted to cover and uncover the aforesaid ports, respectively, substantially in the manner and for the purposes herein described.

2. In a combined stop and check valve, the combination of a cylindrical valve-casing hav-

ing ports located opposite to each other in the wall thereof, a centrally-located oscillating valve-stem having oppositely-projecting radial lugs whose ends lie contiguous to the wall of the casing, the swinging plates or valves hinged to the outer ends of said lugs and curved in arcs concentric with the cylindrical casing, said plates being arranged to swing freely between the shaft and the adjacent casing-wall, so as to cover or uncover the aforesaid ports, substantially as described.

3. In a combined stop and check valve, the combination of a cylindrical valve-casing having ports situated opposite each other in the wall thereof, a centrally-located oscillating valve-stem, the swinging valves, plates or covers hinged at their opposite ends to lugs on opposite sides of the stem, so as to have movement between the stem and casing-wall and adapted to cover and uncover the ports, respectively, and the mechanism for oscillating said valve-stem, consisting of suitable pulleys and cables arranged in connection with the elevator or other object, substantially in the manner and for the purposes set forth.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

COFRAN I. HALL.

Witnesses:

ALFRED A. ENQUIST,
BERT N. HILL.