

T. L. JONES & A. PAULY.

Valve-Gear for Combined High and Low Pressure Engines.

No. 148,565.

Patented March 17, 1874.

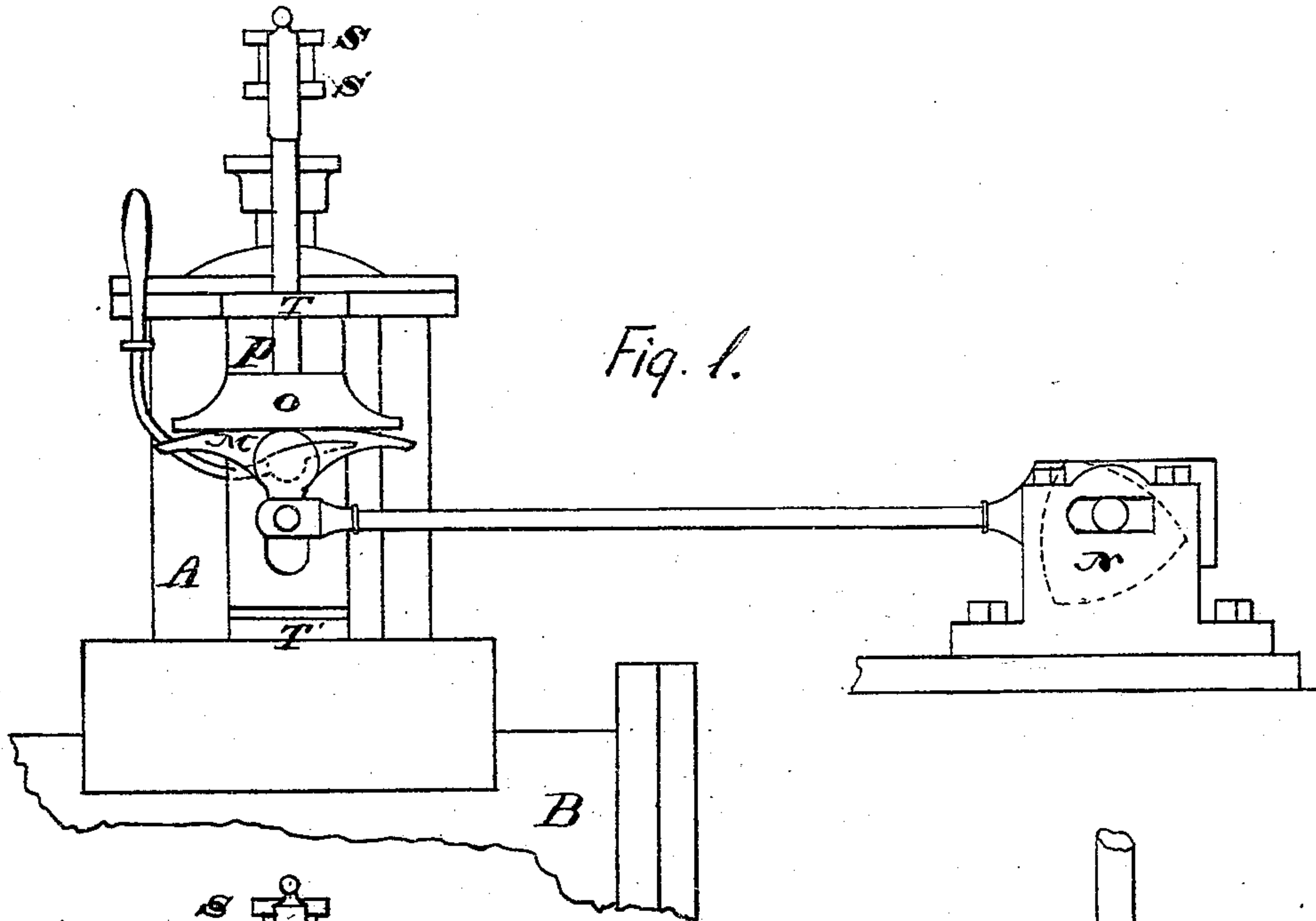


Fig. 1.

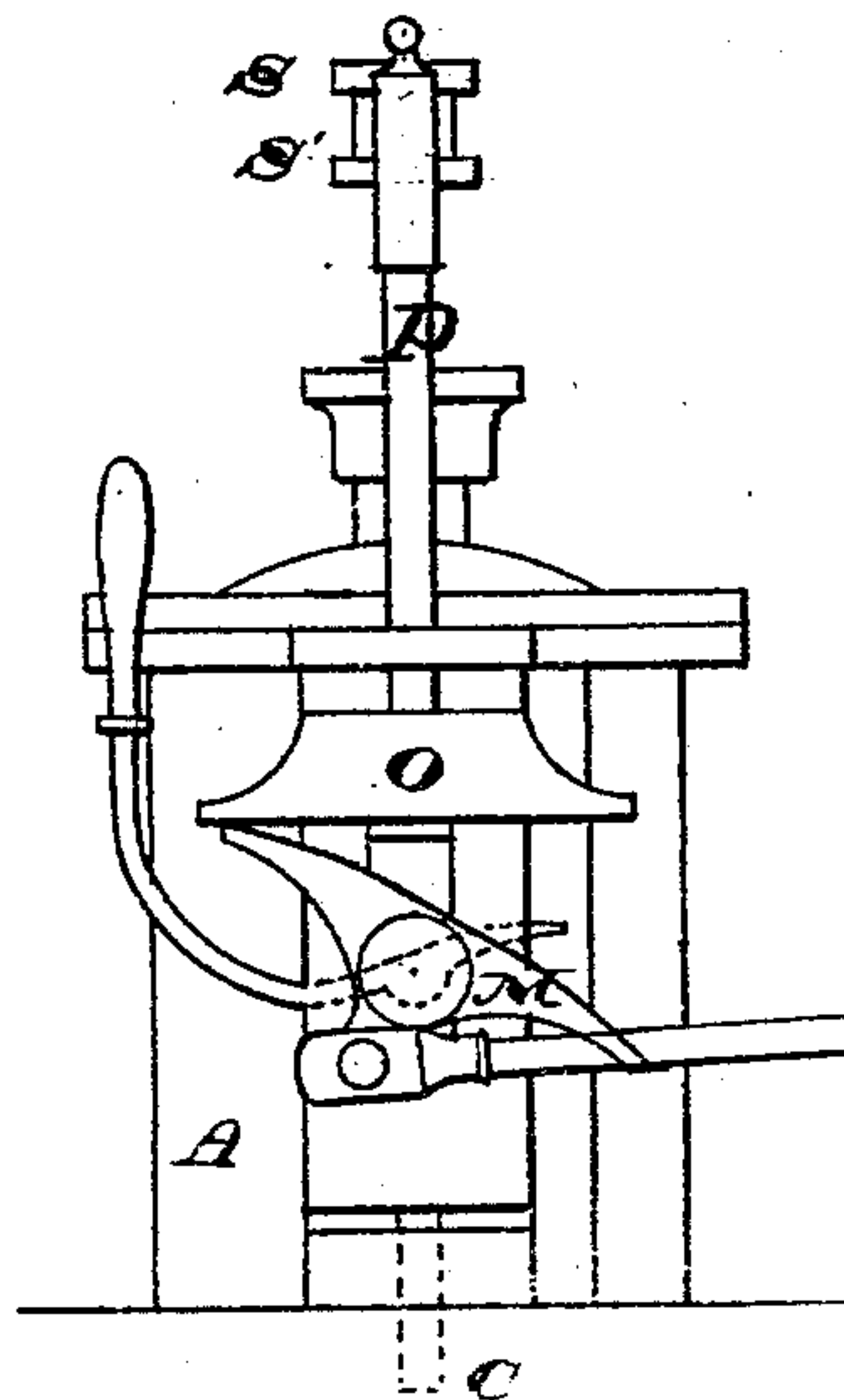


Fig. 2.

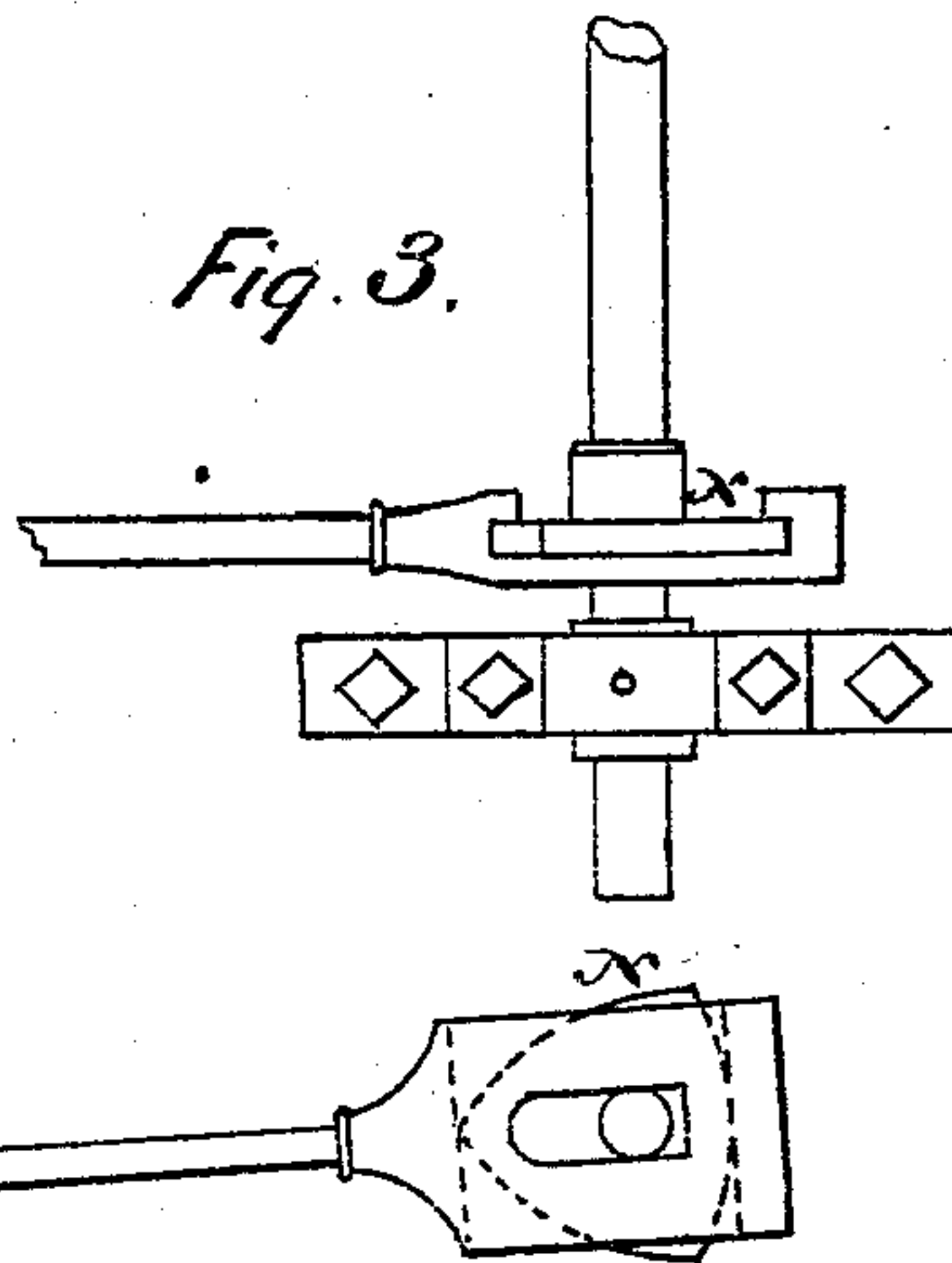


Fig. 3.

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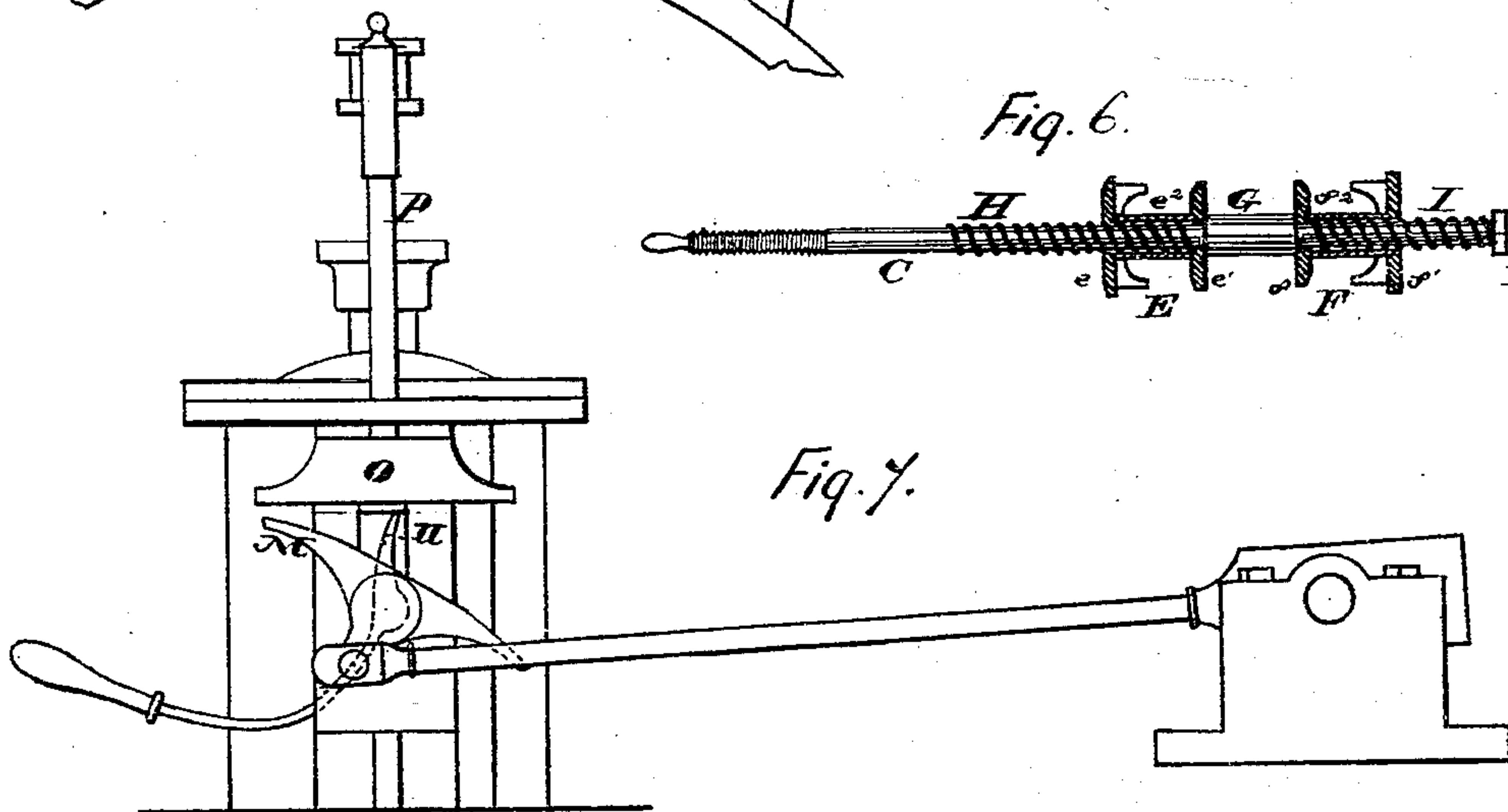
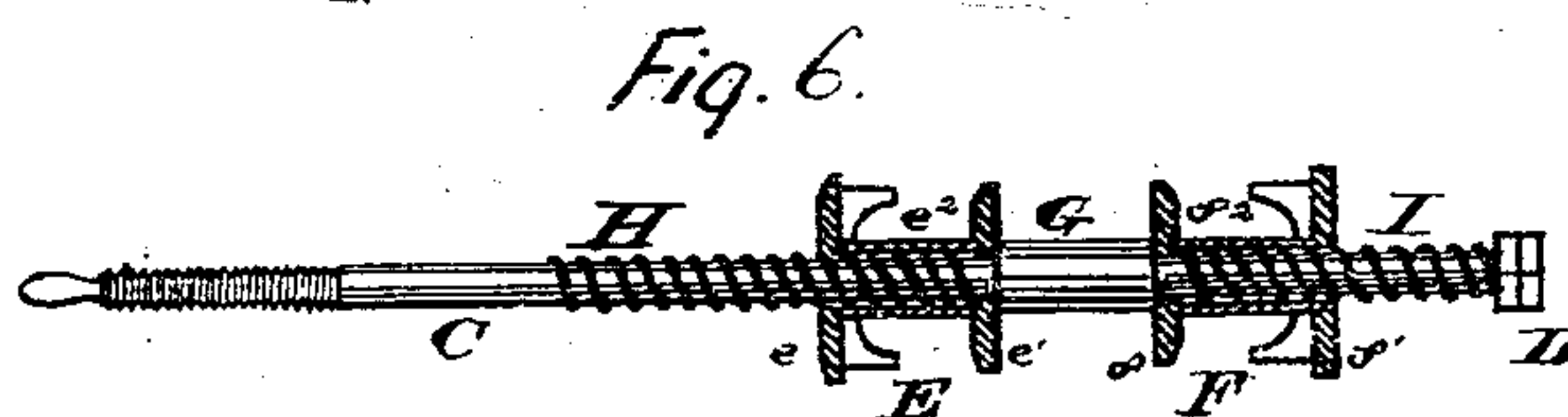
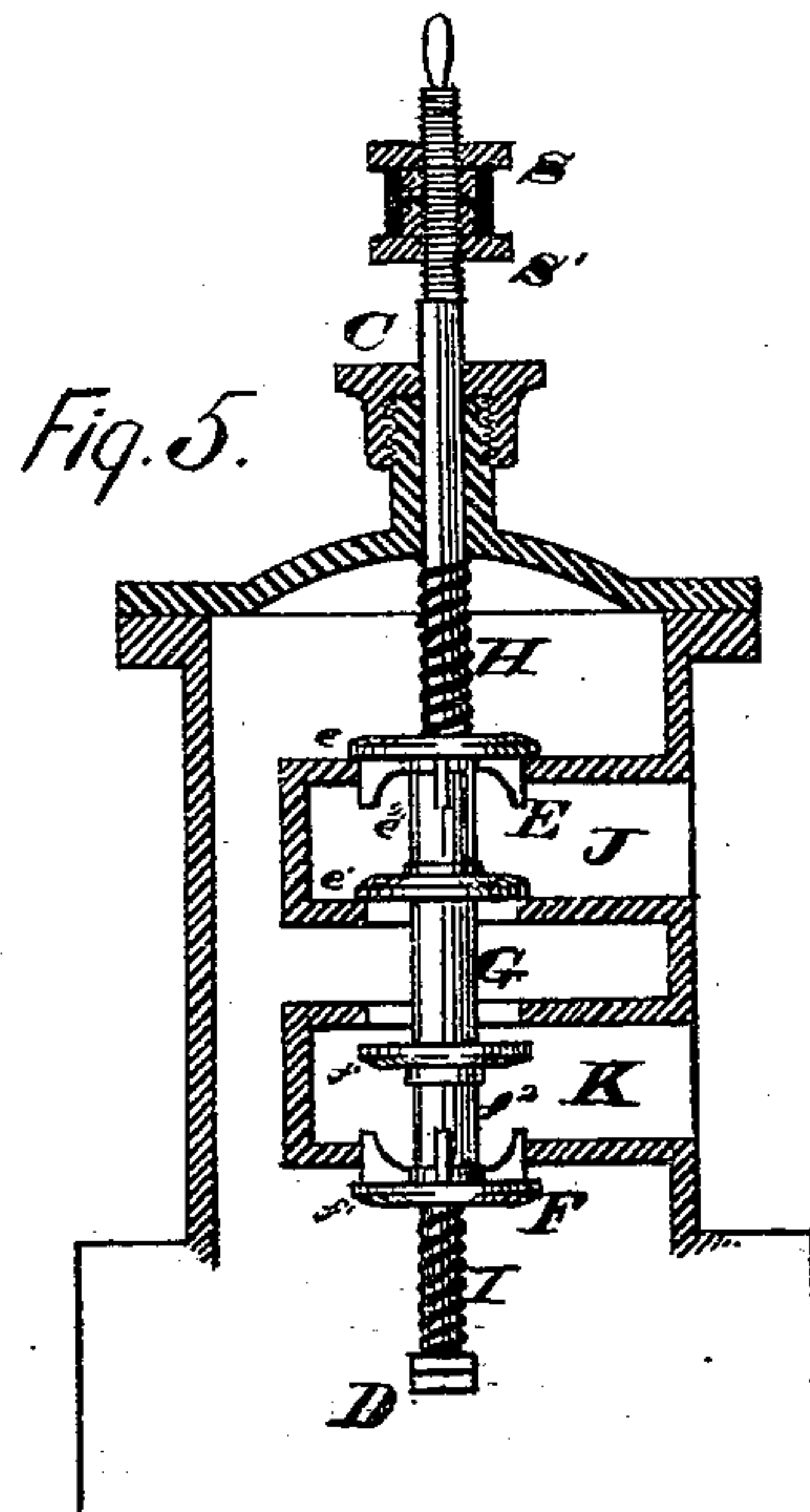
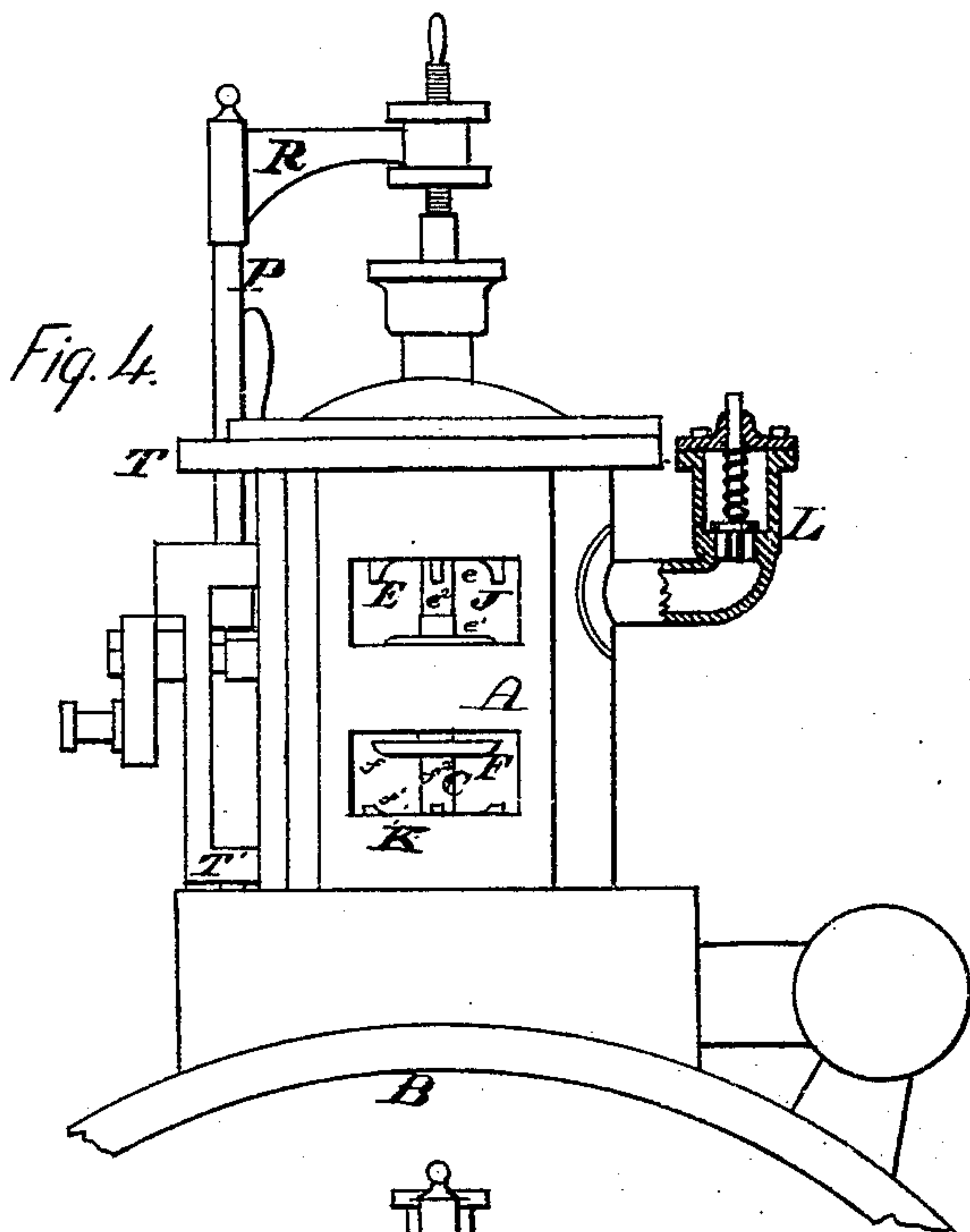
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By Chas. D. Moody,
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UNITED STATES PATENT OFFICE.

THOMAS L. JONES, OF NATCHEZ, MISSISSIPPI, AND ANTHONY PAULY, OF NEW ORLEANS, ASSIGNORS OF ONE-THIRD THEIR RIGHT TO THOMAS P. LEATHERS, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN VALVE-GEARS FOR COMBINED HIGH AND LOW PRESSURE ENGINES.

Specification forming part of Letters Patent No. **148,565**, dated March 17, 1874; application filed November 13, 1873.

To all whom it may concern:

Be it known that we, THOMAS L. JONES, of Natchez, Mississippi, and ANTHONY PAULY, of New Orleans, Louisiana, have invented new and useful Improvements in Combined High and Low Pressure Engines, of which the following is a full, clear, and exact description, reference being hereby had to the accompanying drawing making part of this specification, in which—

Figure 1 is a side elevation, showing connection with main shaft, and the cam (in dotted lines) thereon. The lifter and valve-stem are down. Fig. 2 shows the lifter and stem raised. Fig. 3 is a top view of main shaft, cam, and yoke. Fig. 4 is an end elevation, showing ports, relief-valve, and connection with engine. The atmospheric valve is closed and condenser-valve open. Fig. 5 is a sectional elevation, the condenser-valve open. Fig. 6 is a detail, showing valve-stem, valves, and springs. Fig. 7 is a side elevation, showing position of toe and valve-stem when thrown out of connection with lifter.

Like letters indicate like parts.

The present invention is mainly an improvement upon the invention described in patent granted the said THOMAS L. JONES, September 14, 1869, and numbered 94,891, to which patent reference is hereby made for a better understanding of the state of the art to which this improvement relates.

The object of the construction referred to is to provide means whereby the advantages, respectively, of a high and of a low pressure engine can be obtained conjointly; and consists mainly in a peculiar construction by means of which, after the steam at each stroke of the piston has been exhausted into the open air until the steam-pressure in the exhaust end of the cylinder equals the pressure of the atmosphere, the remainder—viz., one atmosphere—is diverted into a condenser. Such construction consists mainly of two valve-chests, arranged side by side, one of which is termed the atmospheric-valve chest, containing an atmospheric valve, not balanced, and the other, termed a condenser-valve chest, containing a condenser-valve, balanced. In each chest a

valve-stem is arranged vertically, the stems, respectively, projecting through the tops of either chest, and there connected by a cross-head. Between the chests a steam-passage is arranged horizontally. The whole device is connected with the exhaust side pipe of the engine by means of a pipe leading into the atmospheric chest.

To secure a simpler, cheaper construction, and one more easily and safely operated, is mainly the object of the present improvement, which consists chiefly in the use of a single valve-chest in place of two valve-chests, as above described, and in the arrangement of the atmospheric and condenser valves, valve-seats, and stem therein. It further consists in the means employed in operating the valves. It further consists in the provision for the liberation of the steam in the event of accident, all substantially as is hereinafter set forth.

In the accompanying drawings, A represents the improved valve-chest, consisting of a chamber, preferably resting on top of the cylinder, between its side pipes, and connected, as shown in Fig. 4, with the exhaust side pipe, at any preferable point therein between the positions of the ordinary valves employed in exhausting the steam from the engine.

Although adapted to engines of various constructions, the invention, as shown in the drawing, is arranged, in manner found convenient, in connection with engines in use on steamers on the western rivers. In such use, the engine is arranged horizontally, or nearly so, and is provided with a steam and with an exhaust side pipe, which side pipes extend longitudinally on either side, near the top of the cylinder. In these side pipes, and arranged near the ends thereof, puppet-valves, suitably operating, respectively admit the live steam into, and discharge the exhaust steam from, the cylinder.

Although the present invention necessarily operates in connection with such puppet-valves, and with the piston in the cylinder, such last-mentioned parts have not been shown, nor has the steam side pipe, as their construction and operation are well understood, it being intended that the said invention shall be used in con-

nection with the exhaust steam only as it is being liberated by the valves in the exhaust side pipe.

C represents a valve-stem, arranged vertically in the chest, and extending sufficiently through and above the top thereof to enable it to be operated, as hereinafter described. The lower end of the stem preferably extends slightly below the level of the bottom of the chest, and into the chamber connecting the chest with the side pipe of the engine, and is provided with a nut and washer, D. On this stem C are arranged an atmospheric valve, E, and a condenser-valve, F, the former above the latter. Both of these valves are balanced, (for that purpose being made, respectively, each in two similar parts, $e e^1$ and $f f^1$), and are similarly arranged loosely on the stem. The two parts, respectively, of the atmospheric and of the condenser valves are similarly connected by the parts, respectively, e^2 and f^2 . Between the lower part, e^1 , of the atmospheric valve and the upper part, f , of the condenser-valve a collar, G, is fastened to the stem by means of a key. The parts e^2 and f^2 , that, respectively, connect the two parts of the valves, are tubular, and in diameter are sufficiently large to receive springs H and I, which, respectively, encircle the stem at the upper and at the lower ends thereof. These springs, when uncompressed, extend respectively through the parts e^2 and f^2 , projecting above the atmospheric valve in the one case, and below the condenser-valve in the other case. The lower spring I rests upon the washer D. Its upper end presses against the under side of the upper part of the condenser-valve. The upper spring H rests upon the lower part of the atmospheric valve. Its upper end presses against the top of the chest. The atmospheric and the condenser valves, respectively, open and close passages into what we term the atmospheric and the condenser ports J and K. L represents what we term a "relief-valve," its general construction resembling that of an ordinary safety-valve. It is connected with the valve-chest A, preferably at the side thereof. M represents a lifter, that is operated, through a connecting-rod, by a cam, n , on the main shaft. The movement of the lifter raises a toe, O, which, through a vertical rod, P, and horizontal arm R, connected with the projecting valve-stem C above the chest, raises the valves. The arm R is connected with the stem by means of jam-nuts S S', by means whereof the valves can be suitably set. The rod P, both above and below, passes through guides T T'.

In operation, the steam at each movement of the piston, being liberated by the ordinary valve in the exhaust side pipe, passes from such side pipe up into the chamber A, circulating freely around both the atmospheric and condenser ports therein. By means of the lifting mechanism above described, and which has been suitably adjusted, the stem C is caused to rise, and, by means of the collar G,

to lift the atmospheric valve E. Both the atmospheric valve and the condenser-valve are loose upon the stem. Owing to the action of the spring I, which is arranged so as to bear upward against it, the condenser-valve is kept closed when the atmospheric valve is open, and the steam is passing out the atmospheric port J. Sufficient steam having passed off to establish an equilibrium between the atmosphere without and the steam-pressure within the chamber A and the engine B, (the valve in the exhaust side pipe of the engine remaining open meanwhile,) and at the same time the lifter m , the parts operating such lifter being properly adjusted therefor being reversed, the stem and atmospheric valve fall in consequence of their gravity, and close the atmospheric port. Although by this movement the lower end of the spring I has been depressed, the condenser-valve has not yet opened, owing to the expansion of the spring I. When, however, the stem has descended sufficiently to enable the collar G to press down upon the condenser-valve, (which does not occur until the atmospheric valve has closed,) the latter opens, and the steam-current is then diverted into the condenser-port K. The stem is then caused to rise, carrying with it the spring I, which, pressing against the condenser-valve, closes it. The atmospheric valve has not yet opened, as the collar G has not yet reached it. When it does, the atmospheric valve rises, and the operation is repeated. The spring H assists in pressing the atmospheric valve down. In large engines gravity is sufficient of itself. The lifting mechanism is so adjusted that the atmospheric valve is allowed to fall at about the moment of time when an equilibrium is established between the steam-pressure inside the chest and the atmosphere outside.

It is found, in practice, (the above-described invention having been in use for a considerable space of time upon the steamer Natchez on the lower Mississippi,) that several important advantages accrue: Owing to the atmospheric valve being balanced, it can be operated easily and without wrenching any part; second, there being two openings into the atmospheric-port chamber, a large opening is obtained with a slight movement of the stem; third, the two valves, and all the parts immediately connected therewith, being arranged on a single stem, and all contained in a single chamber, the general movement is simple and easy, and the construction economical; fourth, the valves being allowed to rotate on the stem, a more even wear upon their seats is insured; fifth, the use of the springs, arranged, as described, around the stem and inside the valves, provides a simple and efficient means for securing the proper movement of the valves; sixth, extending the springs into the valves enables a sufficient length of spring to be used; seventh, in combination with the use of a balanced atmospheric valve, the relief-valve affords an outlet for the steam in case of accident.

By a suitable lever and accompanying lifter,

U, the invention can be thrown out of gear, and all the exhaust steam can pass off through the atmospheric port, as in the case of an ordinary high-pressure engine. In connection with this last-mentioned part, the use of the relief-valve is especially valuable, being both an alarm and a safeguard until the operator has had time to disconnect the parts.

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

1. The combination of the valve-chest A, stem C, valves E and F, collar G, springs I and H, washer D, and ports J and K, all con-

structed and arranged for operation substantially as described and shown.

2. The combination of the valve-chest A, stem C, valves E and F, collar G, springs I and H, washer D, and ports J and K, and the relief-valve L, all constructed and arranged for operation substantially as described and shown.

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