

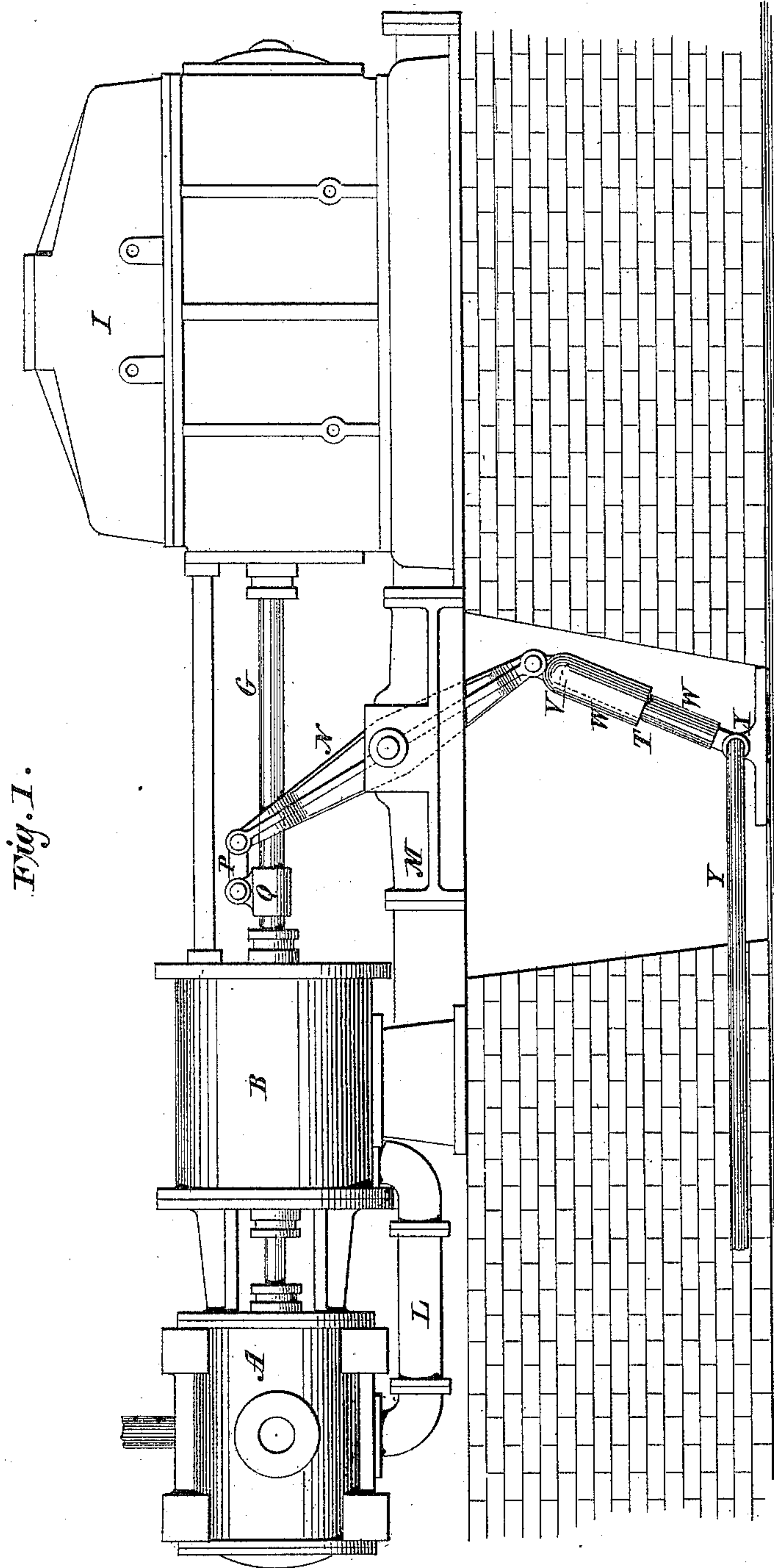
(No Model.)

2 Sheets—Sheet 1.

J. A. GROSHON.
DIRECT ACTING STEAM ENGINE.

No. 446,582.

Patented Feb. 17, 1891.



WITNESSES:

Gustave Dietrich
R. A. Porteous

INVENTOR

John A. Groshon,
BY *Chas. C. Gill*
ATTORNEY

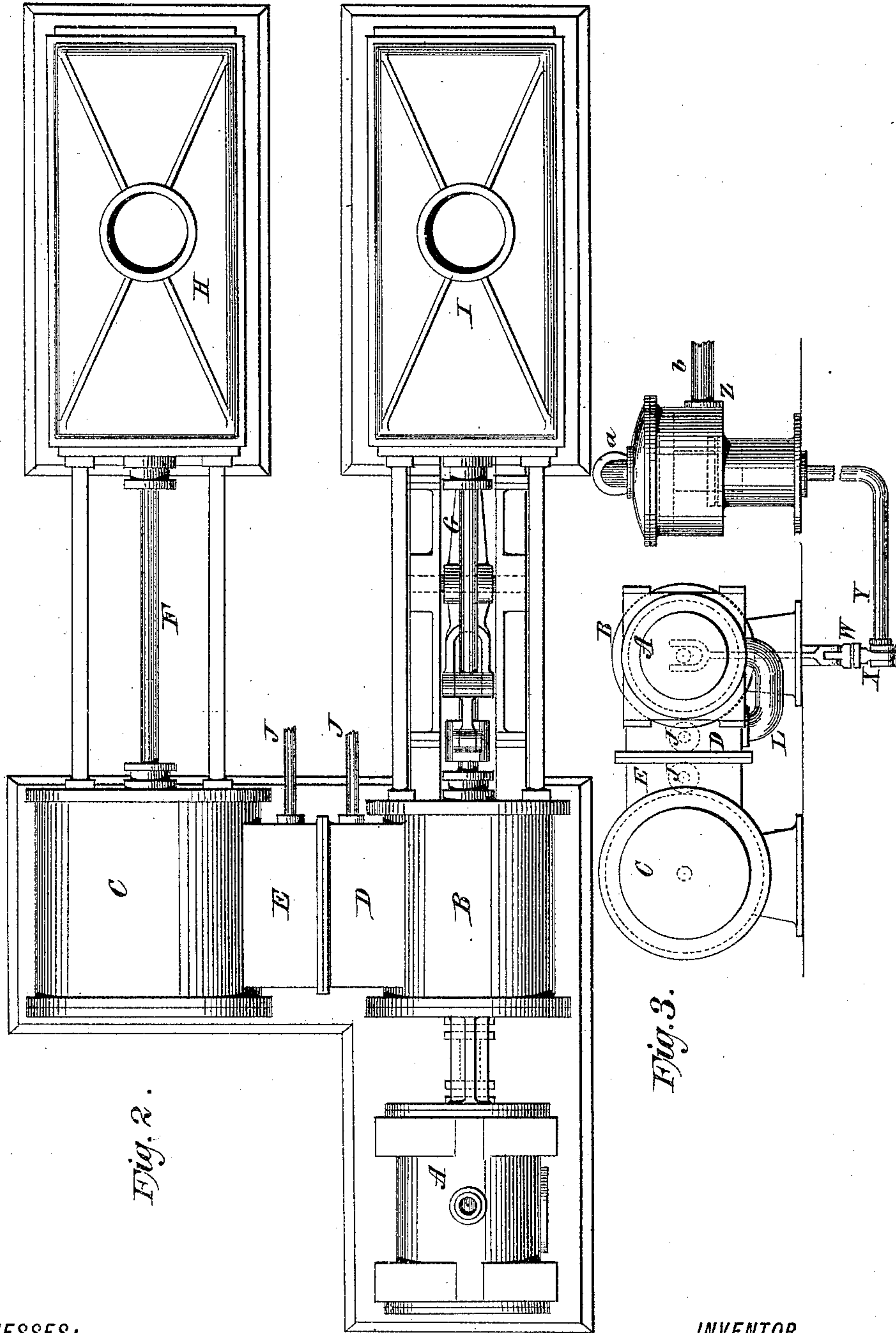
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UNITED STATES PATENT OFFICE.

JOHN A. GROSHON, OF NEW YORK, ASSIGNOR OF ONE-HALF TO JOHN LOCKWOOD, OF JAMAICA, NEW YORK.

DIRECT-ACTING STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 446,582, dated February 17, 1891.

Application filed July 5, 1888. Serial No. 279,029. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. GROSHON, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Direct-Acting Steam-Engines, of which the following is a specification.

The invention relates to improvements in direct-acting steam-engines, and pertains, first, to the arrangement of the initial, expanding, and low-pressure cylinders, the whole, when combined with suitable gearing, forming a direct-acting triple-expansion steam-engine, and, second, to the novel mechanism (hereinafter described) whereby the main piston-rod during the first portion of its stroke is retarded and during the latter portion of its stroke assisted by pressure from an accumulator.

The object of the invention is to secure economy in the use of the steam, the arrangement of the cylinders being such as to permit the introduction of the steam into the same under the exact pressure required, according to their area and the work to be performed. The steam is first admitted to the initial cylinder under definite pressure and in definite quantity, and this cylinder governs the conditions under which the steam enters the expanding and low-pressure cylinders.

The invention will be fully understood from the detailed description hereinafter presented, taken in connection with the drawings hereto annexed.

Referring to the accompanying drawings, Figure 1 is a side elevation of an engine embodying my invention. Fig. 2 is a top plan view of the same, and Fig. 3 is an end view on a smaller scale.

In the drawings, A B C designate, respectively, the initial cylinder, the expanding cylinder, and the low-pressure cylinder, the initial cylinder and expanding cylinder being directly in line with each other and the low-pressure cylinder being at one side of the expanding cylinder and in communication with the same through the medium of the steam-chests, (lettered D E, respectively.)

The piston-rods (lettered F G, respectively)

are in connection with the pumps H I, and the steam-chests are provided with usual ports, valves, and operating-rods J, the initial cylinder being provided with the customary Corliss valve-gear, (not shown,) while the expanding and low-pressure cylinders are provided with slide-valves.

As indicated in Fig. 2, the low-pressure cylinder C is provided with an independent piston-rod F, while the pistons in the cylinders A B are both connected with a single piston-rod G, this arrangement permitting the piston-rods to have an alternating reciprocating movement, the piston in the low-pressure cylinder C moving to the front end of the cylinder while the pistons in the cylinders A B are traveling in an opposite direction. This part of the invention pertains particularly to the arrangement of the cylinders, (lettered A B C, respectively,) and hence the usual Corliss valve-gear and connections have been omitted as constituting no distinct part of the invention and being well understood both as to connection and operation. From the initial cylinder A an exhaust-pipe L passes to the steam-chest D, which leads into the cylinder B, whence the steam passes through the steam-chest E into the low-pressure cylinder C.

Upon the frame M is pivoted the rocking lever N, (shown more clearly in Fig. 1,) having at its upper end the link P, connected by a pivot with the collar Q, secured to the piston-rod G, the lower end of the rocking lever N being pivoted to the upper section of the hollow telescopic lever T, which upper section (lettered V) fits upon the lower hollow section W of said telescopic lever, as indicated in Fig. 1. The lower section W of the telescopic lever is pivoted in the frame X and is in communication with the pipe Y, leading from the accumulator Z, the latter being illustrated in Fig. 3, and it consists of the upper and lower sections, containing the pistons having different diameters, as illustrated by dotted lines in said figure, a supply-pipe *a* leading to the upper side of the piston of larger diameter and a pipe *b* passing from the lower side of said piston to the condenser of the steam-engine. When the pipe *a* is employed for supplying air to the upper side of the piston, the

pipe *b* will be made use of in connection with the condenser for the purpose of preserving a vacuum in the lower side of said piston. When, however, water is to be used for creating a pressure on the upper side of the piston, the pipe *b* will be open to the atmosphere. The lower portion of the accumulator *Z*, the pipe *Y*, and the hollow sections *V W* of the telescopic lever will be completely filled with water, which will be under the pressure of the accumulator *Z*, (or accumulator of different form, if desired,) and the object of this pressure, acting through the telescopic lever *T*, is to create through the rocking lever *N* a resistance to the movement of the piston-rod *G* during the first portion of its stroke and to assist the movement of said rod during the latter portion of its stroke.

During the first part of the movement of the piston-rod *G*, and while the pressure from the accumulator *Z* is acting to retard the stroke of the pistons in the cylinders *A B*, the steam will be admitted under full pressure to the cylinder *A*, and at about the time the lever *N* is in a vertical position the supply of steam will be cut off and the steam already within the cylinder will have an expansive action while the pressure of the accumulator is operating through the pipe *Y*, the telescopic levers *T*, and the lever *N* to assist the movement of the piston-rod *G*. The steam being cut off from the cylinder *A* after the piston therein has made a portion of its stroke, that

portion thereof within the cylinder *A* and the cylinder *B* expands and moves the piston-rod *G* outward toward the pump *I*. After the piston-rod *G* has about completed its stroke the steam exhausts into the steam-chest *E* and thence into the low-pressure cylinder *C* and imparts an opposite movement to the piston therein, the piston-rods *F G* thus having an alternating reciprocating movement.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with a direct-acting steam-engine, the rocking lever *N*, in connection with the piston-rod of same, the hollow telescopic lever *T*, pipe *Y*, and accumulator in connection with said pipe, substantially as and for the purposes set forth.

2. In combination with a direct-acting steam-engine, the accumulator *Z*, provided with the piston having two diameters, the pipe *Y*, leading from said accumulator, and the hollow telescopic lever consisting of chests *V W*, the lower section being in communication with said pipe and the upper section being pivoted to the rocking lever *N*, substantially as and for the purposes set forth.

Signed at New York, in the county of New York and State of New York, this 3d day of July, A. D. 1888.

JOHN A. GROSHON.

Witnesses:

CHAS. C. GILL,
R. A. PORTEOUS.