

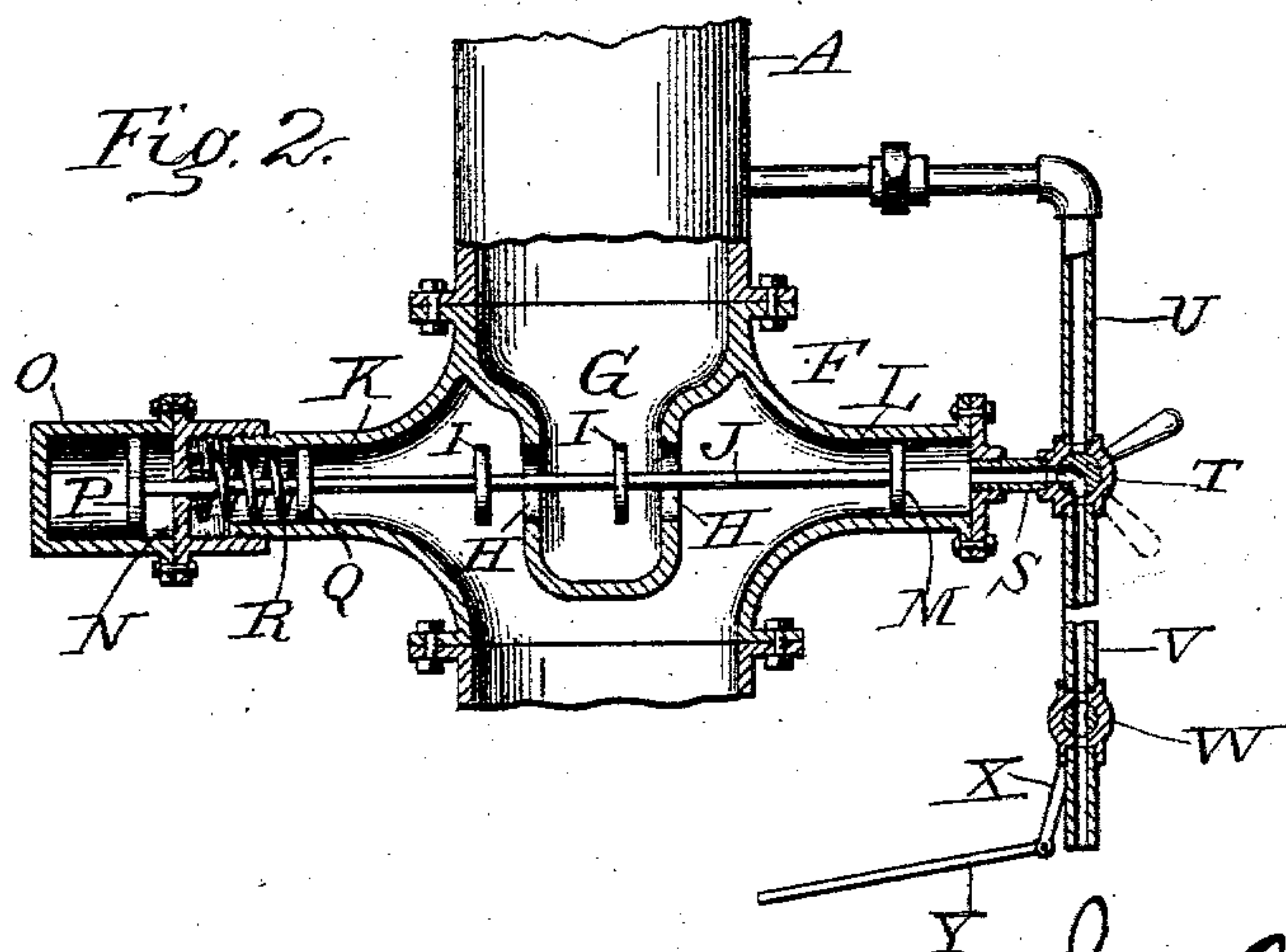
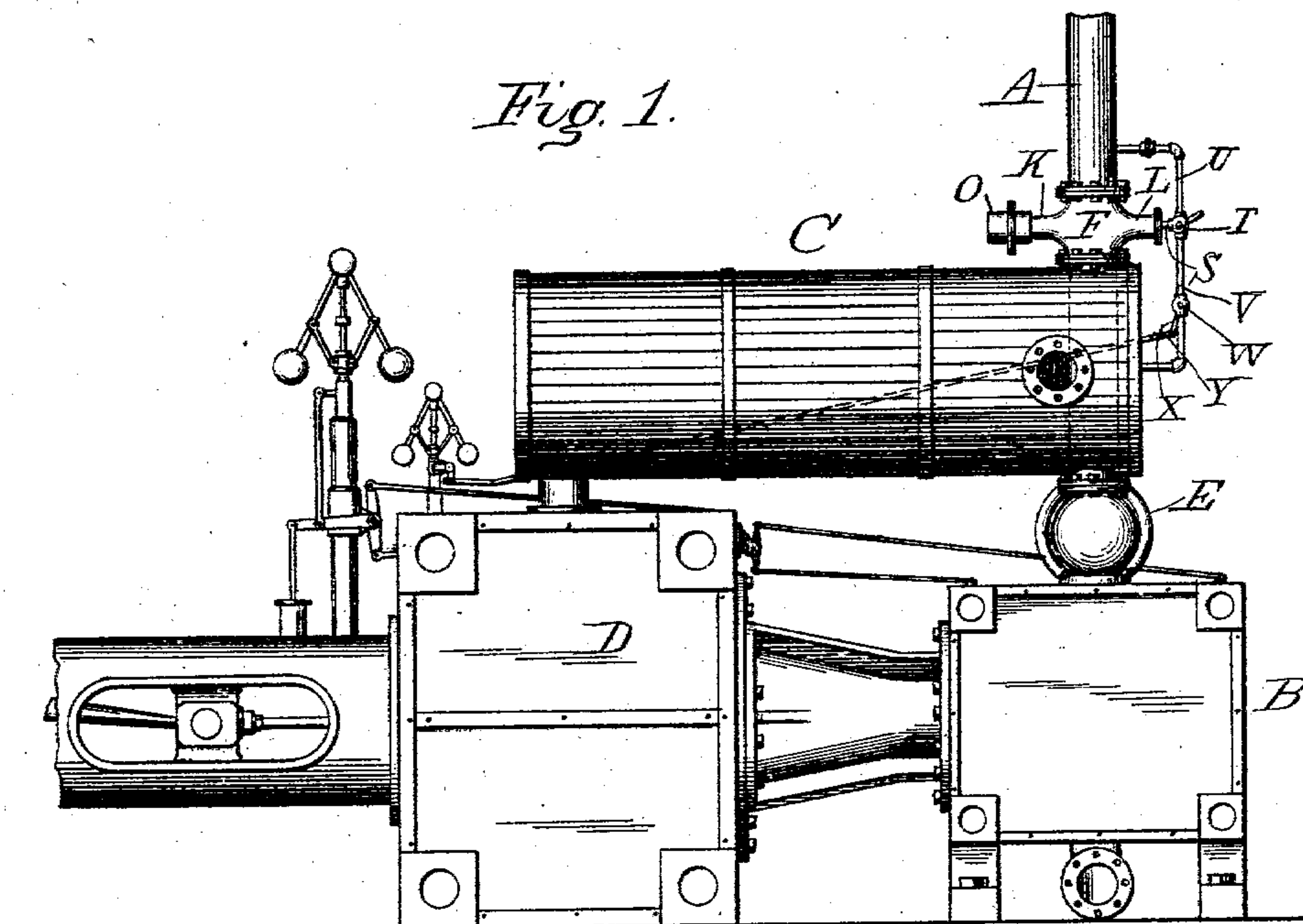
No. 720,940.

PATENTED FEB. 17, 1903.

J. W. LYONS.
STEAM ENGINE.

APPLICATION FILED JULY 19, 1902.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

JAMES W. LYONS, OF CHICAGO, ILLINOIS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 720,940, dated February 17, 1903.

Application filed July 19, 1902. Serial No. 116,259. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. LYONS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification.

My present invention pertains to improvements in steam-engines, and relates more particularly to an apparatus for controlling the initial pressure of the steam as it passes to the engine.

The present apparatus is designed more especially for use in connection with compound engines and is so illustrated.

Figure 1 is a side elevation of a compound engine employing a receiver, the controlling apparatus being shown in elevation; and Fig. 2, a vertical sectional view of said apparatus.

The main object of my invention, as above indicated, is to control in Corliss or other types of automatic cut-off engines the initial pressure of steam or other pressure fluid, so as to secure the best working conditions under all circumstances.

In the drawings, A denotes the main steam-pipe leading to the supply-chest of the high-pressure cylinder B, said pipe passing through or to one side of the receiver C. Said receiver takes the exhaust from the exhaust-chamber of the high-pressure cylinder and delivers it to the steam-chest of the low-pressure cylinder D, as is usual.

E denotes the ordinary throttle of the main steam-pipe.

A pressure-regulator is interposed in the main supply-pipe between the source of supply and the high-pressure cylinder. In the form illustrated it comprises a chamber F, having formed therein a pocket or second chamber G, the upper open end of which is in direct communication with the main supply-pipe. Said pocket is provided with two diametrically-arranged openings or ports H H, adapted and designed to be controlled under certain conditions by valves I I, which are mounted upon a rod or bar J. The main chamber F is likewise formed with two cylindrical projections K and L.

Rod J terminates at one end within cylinder L and carries a piston M, which works within said cylinder L. The opposite end of

the rod extends through the cylinder K and passes through a stuffing-box carried by the head N into an oil-pot O or the like. A piston-head P, attached to the end of the rod, works in the oil-pot, while a third piston-head Q is secured upon the rod and works in the cylinder K.

A spring R is interposed between piston Q and head N and tends to move rod J to the right and to close the disks or valves over the ports or openings H, consequently shutting off the supply of steam.

A pipe S communicates with cylinder L, the opposite end thereof being connected to and communicating with a three-way valve T.

A pipe U extends from the main steam-pipe A at a point above the chamber F to the upper way of the valve T, while a second pipe V extends from the lower way of the valve and communicates with the receiver C.

A valve W is placed in pipe V, and arm X, which is connected thereto, is in turn connected to a link or rod Y. Said link or rod extends to an auxiliary governor, such as is usually employed in connection with engines to prevent them from running away. With the present construction should the engine run away the extra or auxiliary governor will, acting through link or rod Y, cause valve W to close, thereby shutting off steam from cylinder L, permitting spring R to force the valves to the right, closing the same, shutting off the main steam-supply, and thus effectually stopping the engine.

Normally the spring R tends to close the valves I and cut off the supply of steam from the engine. When the engine is started, the three-way valve T is moved to the position shown in dotted lines in Fig. 2, whereupon steam will pass through the pipe U into the cylinder L and, acting upon the piston M, will move the rod J endwise, compressing the spring and removing the disks or valves from the ports or openings H. Thus it will be seen that steam may pass freely through the pipe A to the steam-supply chest of the high-pressure cylinder B.

After the engine has started the three-way valve T is shifted to the position shown in full lines in Fig. 2. Under these conditions the cylinder L will be in direct communication with the receiver C through the pipe V

and the pressure which is exerted upon the piston M will be equal to that which is maintained within the receiver.

So long as the load remains constant, or practically so, the parts of the apparatus stand in the position shown in Fig. 2—that is, with the valves wide open and the receiver-pressure maintaining them in such position by exerting pressure upon the piston M. If, however, the load be light, then the receiver-pressure will drop, owing to the earlier cut-off, and as a consequence the spring R will tend to shift the rod J lengthwise, partially closing the valves I, and thereby reducing to a certain extent the inlet of steam to the engine. In other words, the pressure-regulator acts to determine the initial pressure in accordance with the demands made upon the engine. Too sudden a movement of the parts will be prevented by the action of the oil-pot O.

It is customary in installing engines to provide an auxiliary governor to trip a butterfly-valve in the main steam-pipe near the throttle-valve, thereby forming what is commonly termed a "safety-stop" to prevent the engine from "running away." Valve W and its connections, as above described, are designed to take the place of the ordinary safety-stop.

It is apparent that the apparatus may be varied in its details, and I do not, therefore, desire to limit myself to the precise construction and arrangement shown. For instance, instead of having the pipe V connected to a receiver or chamber it may be connected to any member which carries the steam from the high-pressure to the low-pressure cylinder. So, too, the valve mechanism and pipe connections may be varied. The valves I may be so formed or arranged as to preclude complete closing of the ports H. This may be accomplished in any well-known way—as, for instance, by making the valves and their seats of such form as to preclude close seating, by providing the valves with small perforations or like by-passes, or by so setting the piston P as to restrict the movement of rod J to a distance less than necessary to completely seat the valves, this latter arrangement being shown in the drawings.

It will of course be understood that the position of the reducing or regulating valve may vary and that any common form of self-closing valve may be employed—as, for instance, a gravitating valve, the spring-valve being selected merely as a type. So, too, in speaking of the cylinder containing the valve-actuating piston as communicating with the connection between the high and low pressure cylinders I mean to indicate and include any connection of said piston with the steam space or conduit by which exhaust-steam from the high-pressure cylinder finds its way to the low-pressure cylinder, whether it be a connecting-pipe, a receiver, one of the steam-chests, or other connection.

Having thus described my invention, what I claim is—

1. In an apparatus for controlling the initial pressure of steam to a compound engine, the combination of a high-pressure cylinder; a low-pressure cylinder; a main supply-pipe; a valve located therein; and means for controlling the position of said valve, said means being actuated and controlled directly by the pressure of the exhaust from the high-pressure cylinder, substantially as described.

2. In an apparatus for controlling the initial pressure of steam to a compound engine, the combination of a main supply-pipe; a high-pressure cylinder; a low-pressure cylinder; a connection intermediate said high-pressure and low-pressure cylinders for conveying steam from one to the other; a valve located in the main supply-pipe; a piston acting upon said valve; and a pipe intermediate the cylinder of said piston and the connection between the high and the low pressure cylinders for conveying steam from said connection to the cylinder of the valve-actuating piston, substantially as described.

3. In an apparatus for controlling the initial pressure of steam to a compound engine, the combination of a high-pressure cylinder; a low-pressure cylinder; a receiver connecting said cylinders; a steam-supply pipe leading to the steam-chest of the high-pressure cylinder; a valve located in said pipe; a piston connected to one end of the valve and working in a cylinder provided therefor; a spring operating upon the valve-stem and tending to close the valve; and a pipe connecting the receiver with the cylinder of the valve-actuating piston, substantially as described.

4. In an apparatus for controlling the initial pressure of steam to a compound engine, the combination of a high-pressure cylinder; a low-pressure cylinder; a receiver connecting said cylinder; a steam-supply pipe leading to the steam-chest of the high-pressure cylinder; a valve located in said pipe; a piston connected to one end of the valve and working in a cylinder provided therefor; a spring operating upon the valve-stem and tending to close the valve; a pipe connecting the receiver with the cylinder of the valve-actuating piston; and means for preventing too sudden a movement of the parts.

5. In an apparatus for controlling the initial pressure of steam to a compound engine, the combination of a high-pressure cylinder; a low-pressure cylinder; a connection intermediate said cylinders for conveying the exhaust from the high-pressure cylinder to the low-pressure cylinder; a main supply-pipe leading to the high-pressure cylinder; a valve located in said pipe; a spring tending to close said valve; a piston connected to the valve-stem; a pipe extending from the main supply-pipe to the cylinder of said valve-controlling piston; a second pipe connecting said cylinder with the connection intermediate the high-pressure and the low-pressure cylinder;

and means for throwing either one or the other of said pipes into communication with the cylinder at will, substantially as described.

5 6. In an apparatus for controlling the initial pressure of steam to a compound engine, the combination of a high-pressure cylinder; a low-pressure cylinder; a connection intermediate said high-pressure and low-pressure
10 cylinders for conveying steam from one to the other; a main steam-supply pipe; a valve located in said pipe; a spring tending to close said valve; a valve-controlling piston connected with the valve, said piston being
15 mounted in a cylinder, substantially as described; a pipe U leading from the main steam-pipe at a point above the valve and communicating with the cylinder of the valve-controlling piston; a pipe V extending from
20 said cylinder to the connection between the high and the low pressure cylinders; and a valve for throwing either one or the other of said pipes U or V into communication with the cylinder of the valve-controlling piston at
25 will, substantially as described.

7. In an apparatus for controlling the delivery of steam to a compound engine, the combination of a high-pressure cylinder; a low-pressure cylinder; a connection intermediate said high and low pressure cylinders
30 for conveying steam from the former to the

latter; a main supply-pipe; a valve located in the main supply-pipe; a spring tending to normally close said valve; a piston acting upon said valve; a pipe intermediate the cylinder of said piston and the connection between the high and low pressure cylinders for conveying steam from said connection to the cylinder of the valve-actuating piston; a valve located in said pipe; a governor; and connections intermediate said governor and the valve, serving to close the valve when the governor exceeds a certain limit of movement, substantially as described. 35 40

8. In combination with the supply-pipe of a fluid-pressure engine, a reducing-valve interposed between the source of supply and the engine-cylinder and tending normally to close or reduce the supply-passage; and a piston connected to said reducing-valve and subject
45 to the pressure of fluid in the engine, whereby said piston is caused to open said valve proportionally to the pressure to which it is subjected. 50

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 55

JAMES W. LYONS.

Witnesses:

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GEORGE W. MCFARLAND.