

No. 735,950.

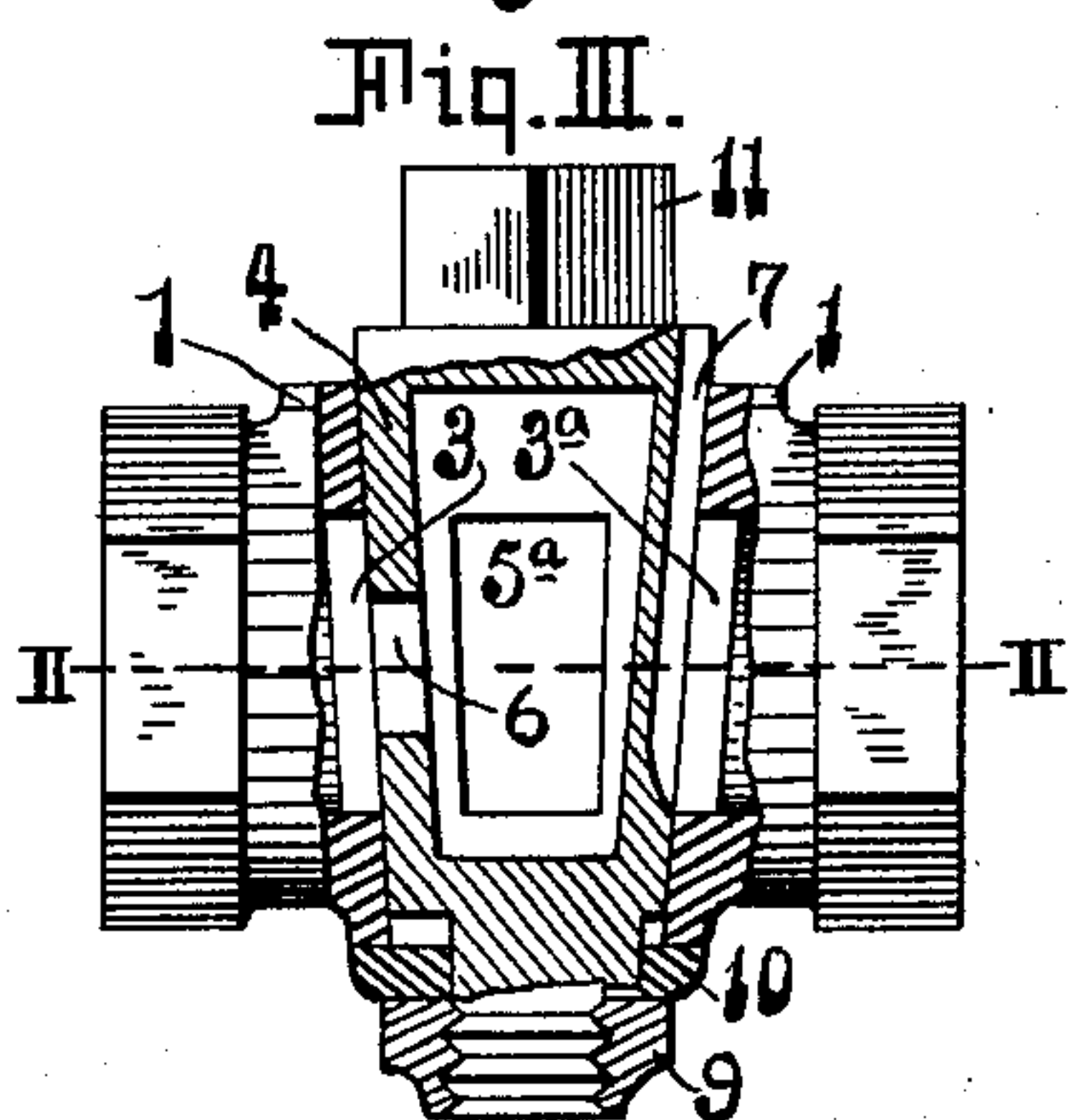
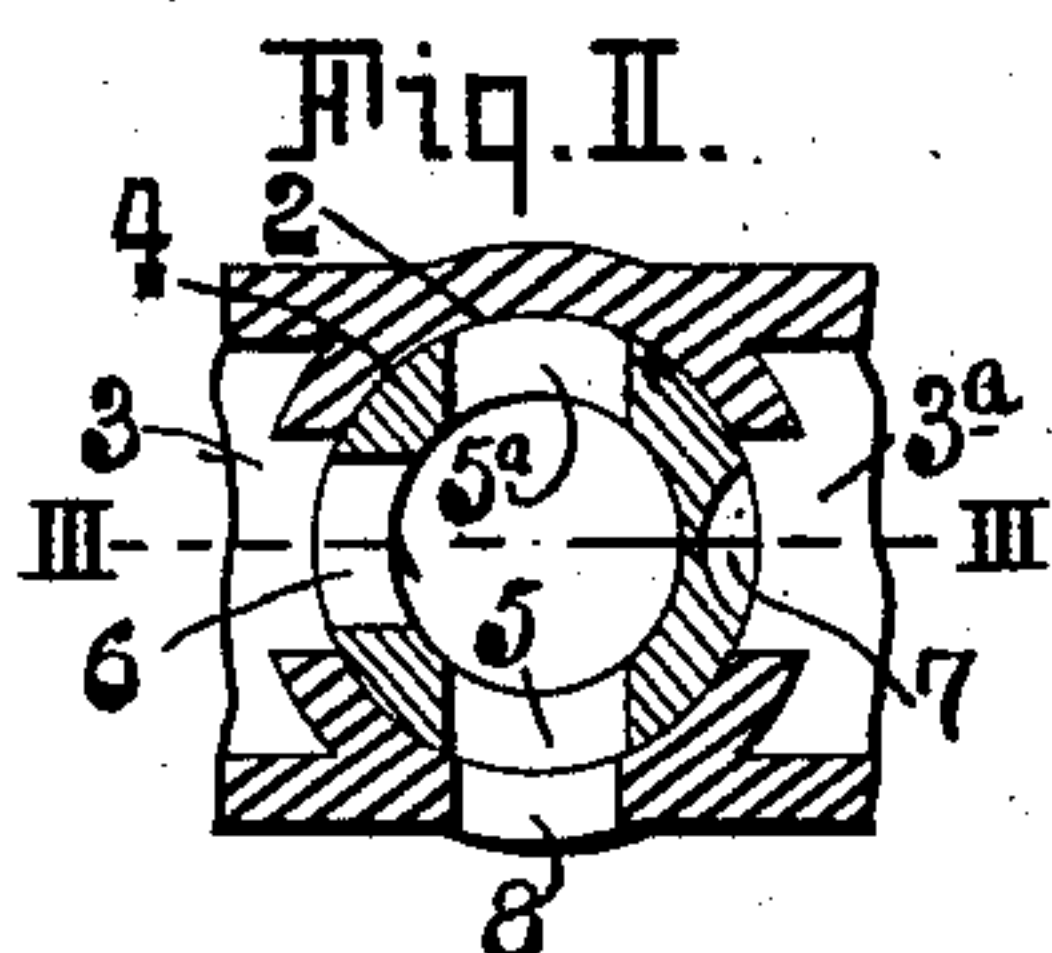
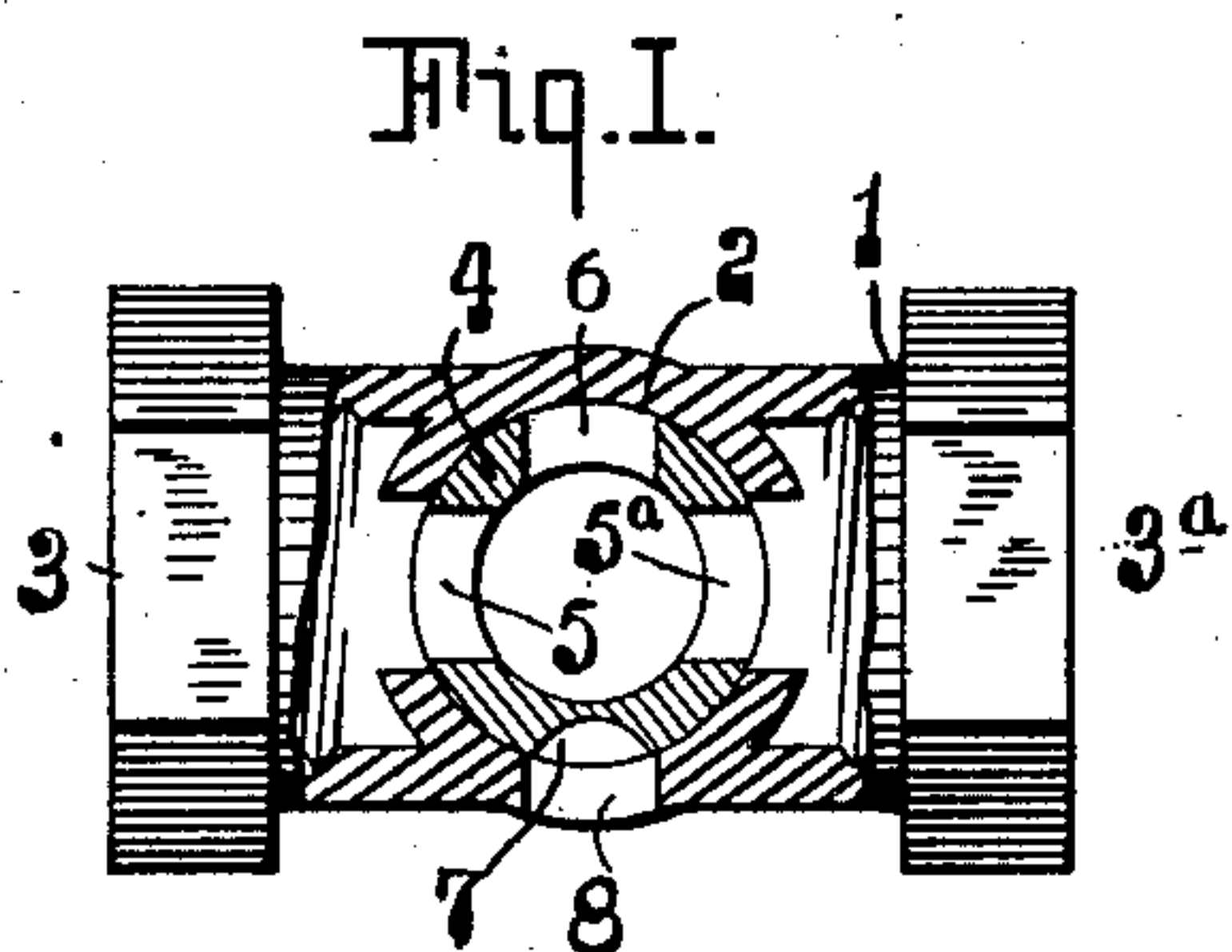
PATENTED AUG. 11, 1903.

W. COOPER.

VALVE.

APPLICATION FILED JULY 11, 1902.

NO MODEL.



WITNESSES:

Geo. H. Harvey.
Emeline Rutter.

INVENTOR,

William Cooper
by Edward A. Lawrence
his Att'y.

UNITED STATES PATENT OFFICE.

WILLIAM COOPER, OF DENVER, COLORADO.

VALVE.

SPECIFICATION forming part of Letters Patent No. 735,950, dated August 11, 1903.

Application filed July 11, 1902. Serial No. 115,112. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM COOPER, a citizen of the United States of America, and a resident of the city of Denver, county of Arapahoe, State of Colorado, have invented certain new and useful Improvements in Valves, of which the following is a specification.

In the drawings which make part of this specification, Figure I is a plan view of my invention, showing the valve open, the valve plug and seat being broken away along the same line as in Fig. II. Fig. II is a broken sectional view of the plug and valve-seat, showing the valve closed along the line III III in Fig. III; and Fig. III is a side view of the valve closed, the plug and valve-seat being broken away along the line III III in Fig. II.

My invention, generally speaking, consists in new and important improvements in emergency-valves for steam-engines.

By means of my valve not only is the supply of steam from the boiler cut off from the engine as effectively as in the use of an ordinary stop-valve, but in the use of my invention in addition I relieve the boiler end of the steam-line from the sudden rush or increase of pressure incident to the sudden and complete closing of a plain stop-valve and at the same time release the engine from the pressure of the steam contained in the steam-line between it and the valve, thus allowing the engine to come to an entire stop without delay. Thus a sudden and complete stoppage, as in cases of emergency, can be effected without danger to the mechanism.

The following is a detailed description of my invention, reference being had to the drawings.

1 is the valve-body of usual design, being provided with the usual threaded extremities, by which it may be incorporated into the steam-line.

2 is the seat, in which the valve-plug turns.

3 is the passage, by which the steam enters the valve from the boiler, and 3^a the passage leading toward the engine.

4 is the hollow plug, turning in seat 2 and provided with ports 5 5^a, cut in the shell of said plug diametrically opposite one another, through which ports the steam passes when the valve is open.

6 is a third port in plug 4, half-way between ports 5 5^a, and diametrically opposite port 6 in the exterior surface of plug 4 I cut a groove 7, extending from about the floor of the passage 3^a when the plug is in position in seat 2 to beyond the top of the valve-casing.

8 is a port cut in the casing at the side of the valve-seat.

9 is a screw-nut, and 10 a washer, by means of which the plug 4 is held in seat 2.

The top end of plug 4 is fitted at 11 for operative connection.

The operation of my device is as follows: When the valve is open, as in Fig. I, the steam from the boiler enters the valve through passage 3 and continues through ports 5 and 5^a in the plug 4 and passage 3^a on to the engine. Meanwhile the casing of valve-seat 2 prevents the steam escaping from through port 6, and the shell of plug 4 prevents the steam from escaping through port 8 in the casing, as will appear by consulting Fig. I. When an emergency stop is to be made, the plug 4 is rotated a quarter-turn to the left, so that port 6 in plug 4 now registers with passage 3 in the valve-body, leading from the boiler, and the port 5, whose former position port 6 has now assumed, registers with port 8 in the casing of the valve-seat. It will thus be seen that the steam from the boiler now enters the valve, as before, through passage 3, but passes through port 6 and thence through ports 5 and 8 into the open air, the casing of the valve-plug 4 preventing it from entering passage 3^a and proceeding to the engine, as before. Groove 7 now registers with passage 3^a, which passage connects with the engine, as has been explained, thus giving passage 3^a a port to the open air through said groove and allowing the escape of the steam contained in that portion of the steam-line between the valve and the engine.

It will thus be readily seen that only does my improved valve shut off the steam from the engine, but also reduces the pressure in the steam-line between the boiler and the valve and prevents the sudden rise thereof upon closing the valve, which rush of pressure in the closing of an ordinary stop-valve frequently results in a rupture of the steam-line or boiler. My valve also enables the engine to respond at once to the shutting of the

valve, owing to the fact that the steam-pressure is also relieved from the engine through groove 7 in the plug 4, and the engine is at once released from the action of the expanding steam. If such exhaust were not furnished, the engine would of course continue to operate until the expansive power of the steam contained in the steam-line between the valve and the boiler was exhausted in operating the engine. This makes a complete and sudden stoppage of an engine not fitted with my improved valve impossible; but in such cases the engine must continue to work until it has used up the steam contained in the steam-line between the valve and itself. I have shown the simplest form of my exhaust of the steam from the engine; but instead of a groove in the exterior surface of plug 4 I may chamber the shell of plug 4 and arrange ports so that when the valve is closed one of said ports registers with passage 3^a, admitting the steam into the chamber in the shell of plug 4; and the other port would release the steam from said chamber into space through a second port in the casing of the valve-seat.

In practice I prefer to make ports 6 and 8 of less size than ports 5 and 5^a, so that when the valve is closed a less volume of steam escapes from the boiler end of the steam-line than when the valve is opened, so that the pressure is not reduced beyond the point required for safety to the steam-line and boiler.

I have shown in the drawings a conical or tapering plug; but I find in practice that a plug and seat of cylindrical form is preferable.

Although my invention may be used as a general stop valve or throttle, I prefer to provide a separate valve for this purpose and use my valve purely as an emergency-valve to be resorted to only when a sudden stoppage of the engine is necessary. My invention is particularly valuable for use in connection with motor-cars or automobiles, especially in the case of those driven by steam. In this class of vehicles sudden stops are frequently necessary to avoid accidents and collisions. The sudden closing of an ordinary throttle-valve in such cases often results in a rupture or strain to the steam or

power line or boiler incident to the sudden rush of pressure when the valve is closed and at best only stops the engine gradually, as above explained, while my valve stops the engine almost instantly and at the same time relieves the boiler and steam-line from all danger from strain and rupture.

I have described my invention with special reference to steam-driven mechanisms; but it is apparent that it is applicable to use in all cases where power is delivered to the motor under pressure—for instance, where compressed air or gas is used.

Although I have described my invention with great minuteness, I do not wish to limit myself thereby, but claim, broadly—

1. In valves for controlling the transmission of expansive power under pressure, the combination of a power-line; a valve-casing fitted in said power-line; a rotatable valve-plug seated in said casing, and ports in said casing and said plug so arranged that when the plug assumes one position the valve is open for the passage of the power through the power-line but when the valve is rotated a quarter-turn the valve is closed and the pressure in said power-line is relieved from both sides of said valve.

2. In valves for controlling the transmission of expansive power under pressure, the combination of a power-line; a valve-casing in said power-line; an inlet-port and an outlet-port in said casing; an escape-port in said casing; a rotatable valve-plug seated in said casing; a passage through said plug adapted to connect together said inlet and outlet ports in said casing when said valve is open and to register with said exhaust-port in said casing when said valve is closed; an exhaust-port in said plug adapted to connect said passage in said plug with said inlet-port in said casing when said valve is closed; and a channel in said plug adapted to connect said outlet-port in said casing with the exterior of said valve when said valve is closed.

Signed by me at Denver, Colorado, this 5th day of July, 1902.

WILLIAM COOPER.

Witnesses:

W. H. O'BRIEN,
ANDREW KELLY.