B. LEWIS.

VALVE.

APPLICATION FILED JULY 29, 1913.

1,156,535. Patented Oct. 12, 1915.

Fig. 1.

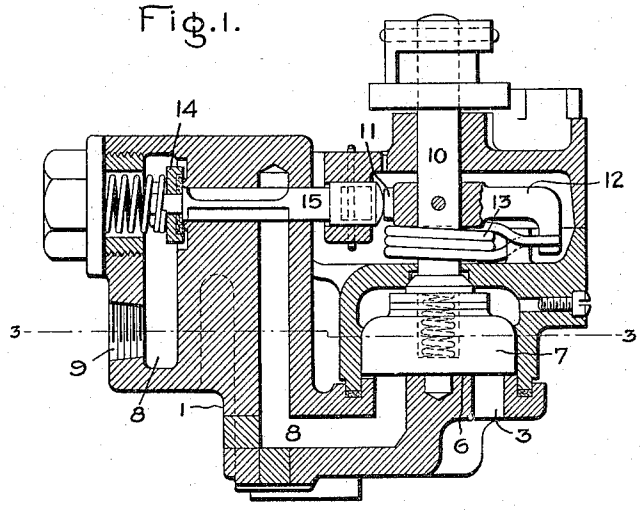


Fig. 2.

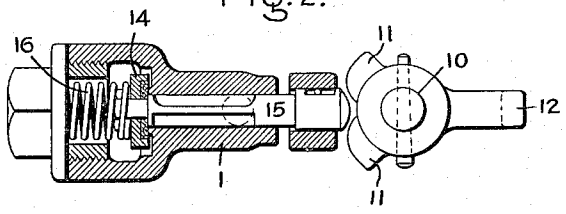
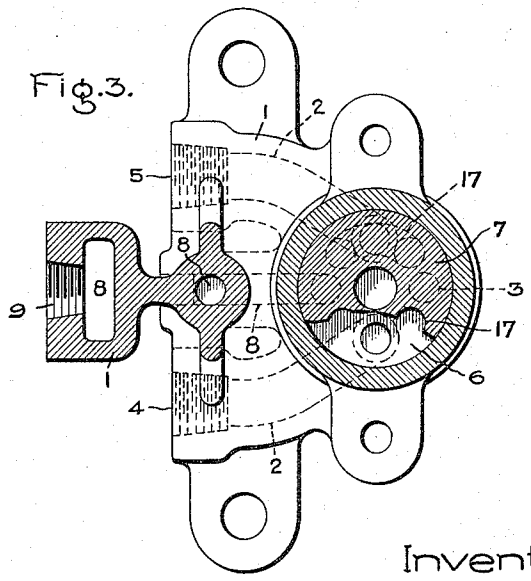


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

BENJAMIN LEWIS, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

VALVE.

1,156,535. Specification of Letters Patent. Patented Oct. 12, 1915.

Application filed July 29, 1913. Serial No. 781,757.

To all whom it may concern:

Be it known that I, BENJAMIN LEWIS, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification.

My invention relates to rotary valves, and the object of my invention is to prevent the leakage of fluid therethrough.

The pressure of the source of fluid is the greatest and most constant pressure to which a valve is subjected and which it must resist. Now a puppet valve is well adapted to control the flow of fluid through a single passage; on the other hand a rotary surface valve or other slide valve is particularly adapted to direct the flow of fluid between different pairs of a number of passages opening to the valve. I propose to provide a valve structure possessing the advantages of a rotary surface valve in directing the flow of fluid between a number of passages with the ability of a puppet valve to resist the pressure of the source of fluid. To do this, I provide a puppet valve in the admission passage to the seat of a rotary valve to relieve the rotary valve of the pressure of the source except when the rotary valve connects the admission passage to another. This is an efficient, inexpensive and readily renewable means for sealing the source of pressure from the other passages and leaves to the rotary valve the direction of the fluid flow. Preferably, the puppet valve is spring-seated and the means for unseating the puppet valve is a suitably shaped cam on the rotary valve stem, which cam engages the puppet valve stem and moves it against the spring pressure as the rotary valve is turned to a certain position or positions.

In the accompanying drawing, I have illustrated a particular valve involving my invention.

Figure 1 is a sectional view of this valve; Fig. 2 is a view partly in section showing the puppet valve and its operating cam, and Fig. 3 is a view partly in section along the line 3—3 of Fig. 1.

The valve casing 1 is provided with the passages 2 leading to the various ports. The port 3 is an exhaust port. The ports 4 and 5 lead to the devices to which it may be desired to supply fluid. The passages 2 and the port 3 all lead to the rotary valve seat 6 on which is seated the rotary surface valve 7. An admission passage 8 conducts fluid under pressure from the admission port 9 to the valve seat 6.

The rotary valve 7 is provided with a stem 10 for operating the same. This stem carries cam members 11 and also the arm 12. A spring 13 acting on the arm 12 tends to return the rotary valve stem 10 and the rotary valve 7 to the mid position illustrated. The rotary valve stem 10 may be provided with a handle or other means for rotating the same.

A portion of the admission passage is extended to a point opposite the cams 11. In this particular valve, this is done by carrying the passage 8 parallel to the rotary valve stem 10. In this portion of the admission passage 8 is located the puppet valve 14 provided with a stem 15. The puppet valve seat faces the admission port 9 in order that the pressure in the source of fluid pressure may help to maintain the puppet valve 14 tightly against its seat and hence prevent the admission of pressure to the rotary valve seat 6. A spring 16 also tends to keep the puppet valve 14 to its seat. The end of the stem 15 is in the path of travel of the cams 11.

In the particular valve which I have here illustrated, fluid under pressure is to be admitted to either ports 4 or 5, and at the same time exhausted from the other of these ports through the exhaust port 3. To accomplish this, the face of the rotary surface valve 7 is provided with two passages 17 diametrically opposite to each other and of such length as to extend from their respective passages 2 to the admission passage 8 and from their respective passages 2 to the exhaust port 3.

The operation of this valve is as follows: With the rotary valve stem 10 in the neutral position illustrated, all the ports are closed. There is no tendency for the fluid pressure of the source to force fluid between the rotary valve 7 and its seat into one of the passages 2, because the rotary valve 7 is not subject to the pressure of the source of fluid supply, this pressure being received on the puppet valve 14. If, now, the rotary valve 7 is rotated to the right, considering Fig. 2, the passage 2 from the port 4 is connected to the admission passage 8; one of the cams 11 engages the stem 15 of the puppet valve

14, opening passage 8 and allowing fluid to flow from the port 9 through the rotary valve 7 to the port 4. At the same time the opposite passage 17 in the rotary valve 7 connects the passage 2 from the port 5 to the exhaust port 3, allowing whatever fluid there may be in this passage to escape. As soon as the rotary valve stem 10 is released, it is returned by the spring 13 to the lap position shown in the drawing and the puppet valve 14 is reseated by its spring 16. If the rotary valve stem 10 is rotated to the left, the same action takes place, except that the fluid from the port 4 is released and fluid under pressure is admitted to the port 5.

It will be understood that in its broadest aspect my invention is not limited to the particular embodiment shown in the drawings, and I aim in the appended claims to cover all modifications which do not depart from the spirit and scope of my invention as therein defined.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. A valve casing provided with ports, a passage for admitting fluid to the valve seat and passages from the valve seat to the ports, a rotatable surface valve on the seat for directing the flow of fluid between the desired passages, a puppet valve in the admission passage tending to close this passage, and means for rotating the rotatable valve and for unseating the puppet valve when fluid is to be directed from the admission passage to another.

2. A valve casing provided with ports, a passage for admitting fluid to the valve seat and passages from the valve seat to the ports, a rotatable surface valve on the seat for directing the flow of fluid between the desired passages, a puppet valve in the admission passage tending to close this passage, and a stem for rotating the rotatable valve provided with a cam adapted to engage and unseat the puppet valve when the admission passage is connected to another passage by the rotatable valve.

3. A valve casing provided with ports, a valve seat, an admission passage to the seat and passages between the seat and the ports, a rotatable surface valve on said seat, a stem for rotating said valve provided with a cam surface, a portion of the admission passage extending to opposite the cam on the stem, and a puppet valve in that part of said admission passage with its stem perpendicular to the rotatable valve stem adapted to be engaged by said cam surface.

In witness whereof, I have hereunto set my hand this 26th day of July, 1913.

BENJAMIN LEWIS.

Witnesses:

HELEN ORFORD,

MARGARET E. WOOLLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."