W. H. SULLIVAN, DEC'D.
A. S. CHASE, ADMINISTRATRIX.
STEAM ENGINE.
APPLICATION FILED JULY 10, 1912.

1,081,787.

Patented Dec. 16, 1913.

2 SHEETS—SHEET 1.

Fig. 1.

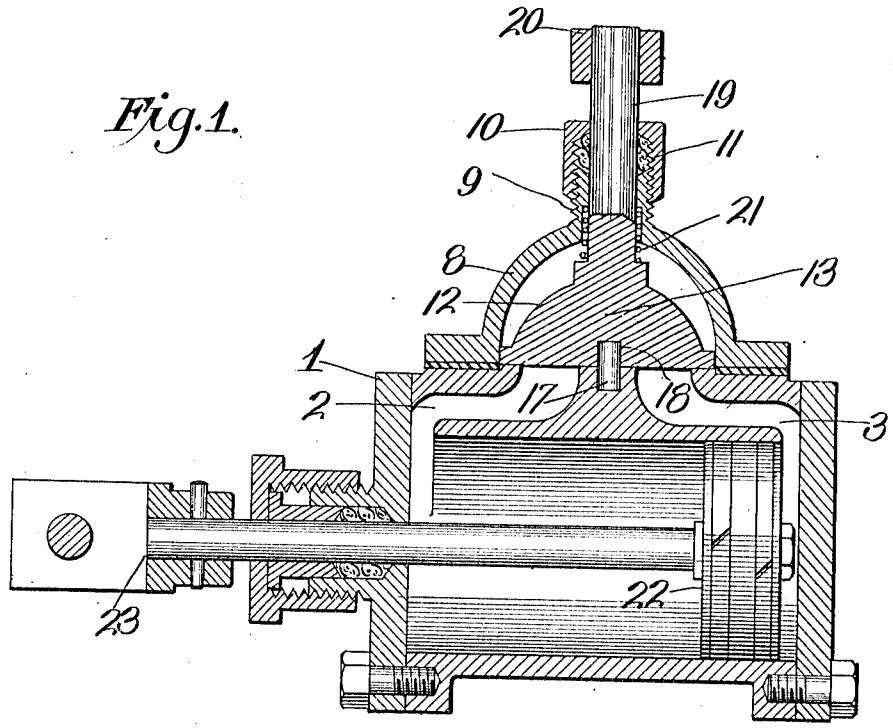
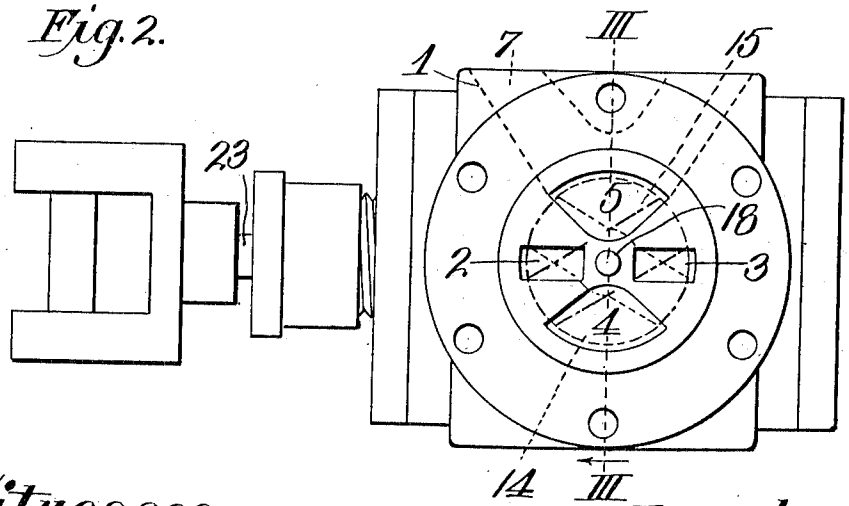


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

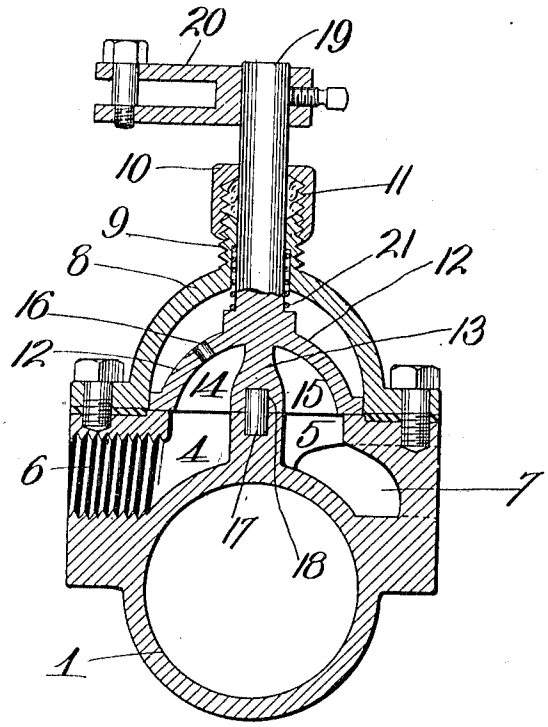
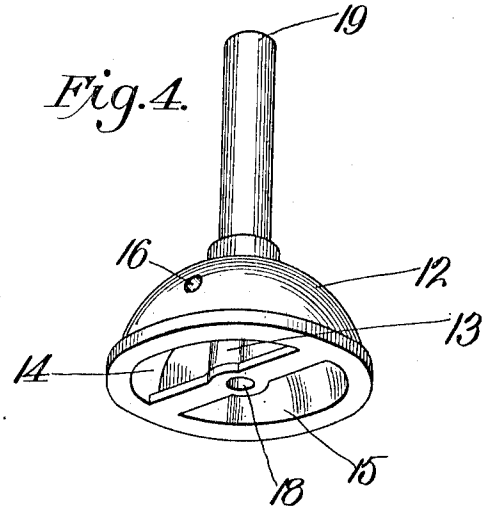


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM H. SULLIVAN, DECEASED, BY ALICE SULLIVAN CHASE, ADMINISTRATRIX, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-HALF TO E. P. CHACE, OF SHAWNEE, KANSAS.

STEAM-ENGINE.

1,081,787. Registered Dec. 16, 1913.

Application filed July 10, 1912. Serial No. 708,565.

To all whom it may concern:

Be it known that I, ALICE SULLIVAN CHASE, (administratrix of the estate of WILLIAM H. SULLIVAN,) a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, hereby apply for a patent for certain new and useful Improvements in Steam-Engines, invented by said WILLIAM H. SULLIVAN, of which the following is a specification.

This invention relates to steam engines of the reciprocatory piston type having oscillatory valves adapted to alternately establish communication between opposite ends of the cylinder and the atmosphere, and has for its object to produce a valve mechanism of simple, strong, durable and inexpensive construction whereby to utilize the volume of steam with the greatest efficiency.

To this end the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be clearly understood reference is to be had to the accompanying drawings, in which:—

Figure 1, is a vertical, central longitudinal section of a part of a steam engine, embodying the invention. Fig. 2 is a plan view of the same, with the steam chest and valve omitted. Fig. 3, is a vertical section on the line III—III of Fig. 2. Fig. 4, is a perspective view of the valve.

In the said drawings, where like reference characters identify corresponding parts in all the figures, 1 is the cylinder of an ordinary engine of the reciprocatory piston type and 2 and 3 are the ports for alternately conducting steam into and from the cylinder.

4 and 5 are supply and exhaust ports respectively, the former communicating with a threaded passage 6 with which a steam supply pipe, not shown, is adapted to be connected. The exhaust port 5 is preferably provided with a pair of branch passages 7 extending obliquely to the longitudinal axis of the cylinder to avoid interference with the exhaust of an adjacent cylinder if more than one cylinder should be used.

8 is a hemispherical steam chest secured upon the cylinder around the upper ends of ports 2 to 5 inclusive, and said chest is provided centrally with an upwardly-projecting tubular stem 9, and engaging said stem is a hollow nut 10 for clamping packing 11 firmly against the upper end of the stem or gland 9.

12 is a hollow hemispherical valve fitting in the chest and upon the cylinder, the hollow side or chamber of the valve being provided with a diametric partition 13 dividing said chamber into a receiving chamber 14 and a discharging chamber 15, and the wall of the valve is provided with an orifice 16 establishing communication between chamber 14 and the interior of the chest above the valve for admitting steam thereto from the port 4, as shown clearly in Fig. 3. The valve is adapted for oscillation around its center or axis upon a cylindrical pin 17 projecting upward from the cylinder into a socket 18 in the middle of the partition 13. In line with said pin, the valve is provided with a stem 19 which projects up through the stem 9 of the chest, and is equipped at its upper end with a crank arm 20 for connection with any suitable means (not shown) actuated by the engine, for oscillating said arm and valve about the vertical axis of the stem 19. To hold the valve pressed yieldingly downward as steam first enters its chamber 14 from the port 4, a helical spring 21 encircles the stem 19 in position to press downward upon the valve and upward against the stem 19.

22 indicates the piston in the cylinder and 23 the stem thereof.

In practice as the piston attains the position shown in Fig. 1, the valve is standing in the position shown by dotted lines, Fig. 2, in which position it will be noticed supply chamber 14 is in communication with the supply port 4 and port 2 of the cylinder, and that chamber 15 is in communication with port 3 of the cylinder and the exhaust port 5 thereof, it being understood that the valve stands in the position described during the travel of the piston from port 2 to port 3, and that as such stroke ends, the crank arm 20 is oscillated to oscillate the valve to the position shown by the heavy dotted lines in Fig. 2 so as to close communication between chamber 14 and port 2 and between chamber 15 and port 3, and open communication between chamber 14 and port 3 and chamber 15 and port 2. As the valve is thus positioned the steam supplied continuously to chamber 14, is cut off from port 2 and enters port 3 and starts the piston on

its reverse stroke, and the exhaust steam is forced by the piston through port 2 into chamber 15 and thence escapes by way of exhaust port 5. It will thus be seen that as the piston stroke in each direction ends, the valve is oscillated to divert the passage of steam from one end of the cylinder to the other.

It will be understood that the valve is a balanced valve owing to the fact that steam from chamber 14 passes through the orifice 16 into the chest above the valve and thus holds the latter balanced, the spring 21 together with the weight of the valve, holding the same with sufficient pressure upon the cylinder to guard against leakage of steam at the lower end of the valve.

From the above description it will be apparent that a steam engine has been produced embodying the features of advantage enumerated as desirable in the statement of the object of the invention and which may be modified in minor particulars without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a steam engine, a cylinder having a pair of steam passages leading to its opposite ends, said passages having ports through the side wall of the cylinder, said ports being located on a line extending lengthwise of the cylinder, a pivot pin seated in the cylinder wall between said ports, and a steam chest secured to the cylinder over said ports and having a hemispherical valve rotatable therein upon said pin, said cylinder having also a supply port and an exhaust port adjacent said first ports and at opposite sides of said pin, the outer margins of all said ports lying within a circle about said pin as a center, said valve being provided with a pair of chambers, one for connecting the supply port with either of said first pair of ports and the other for connecting the exhaust port with the other of said first pair of ports which at the time is not in communication with the supply port.

2. In a steam engine, a cylinder having a pair of steam passages leading to its opposite ends, said passages having ports through the side walls of the cylinder, said cylinder also having a supply port and an exhaust port adjacent said first ports, said exhaust port having branch passages extending obliquely to the longitudinal axis of the cylinder, and a steam chest inclosing said ports and having a valve provided with a pair of chambers one for connecting the supply port with either of said first pair of ports and the other for connecting the exhaust port with the other of said first pair of ports which at the time is not in communication with the supply port.

In testimony whereof I affix my signature, in the presence of two witnesses.

ALICE SULLIVAN CHASE,

Administratrix.

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