

No. 807,865.

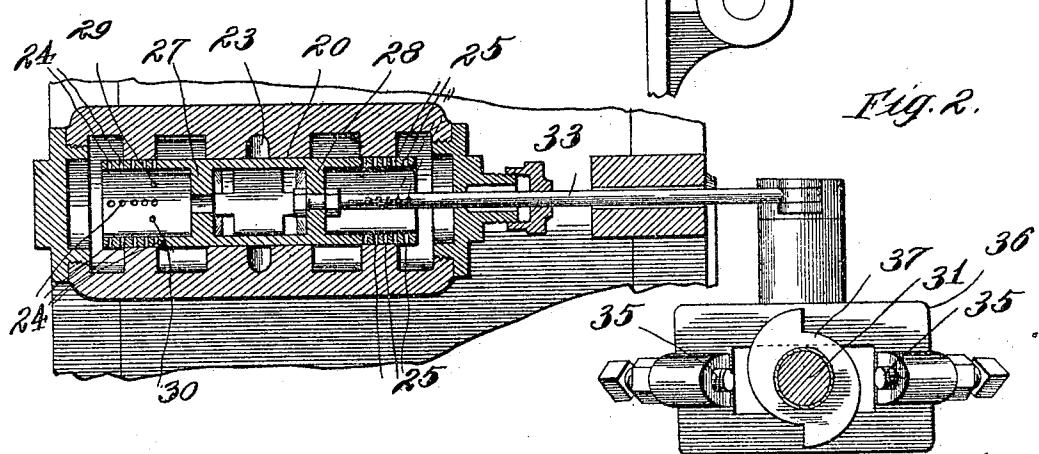
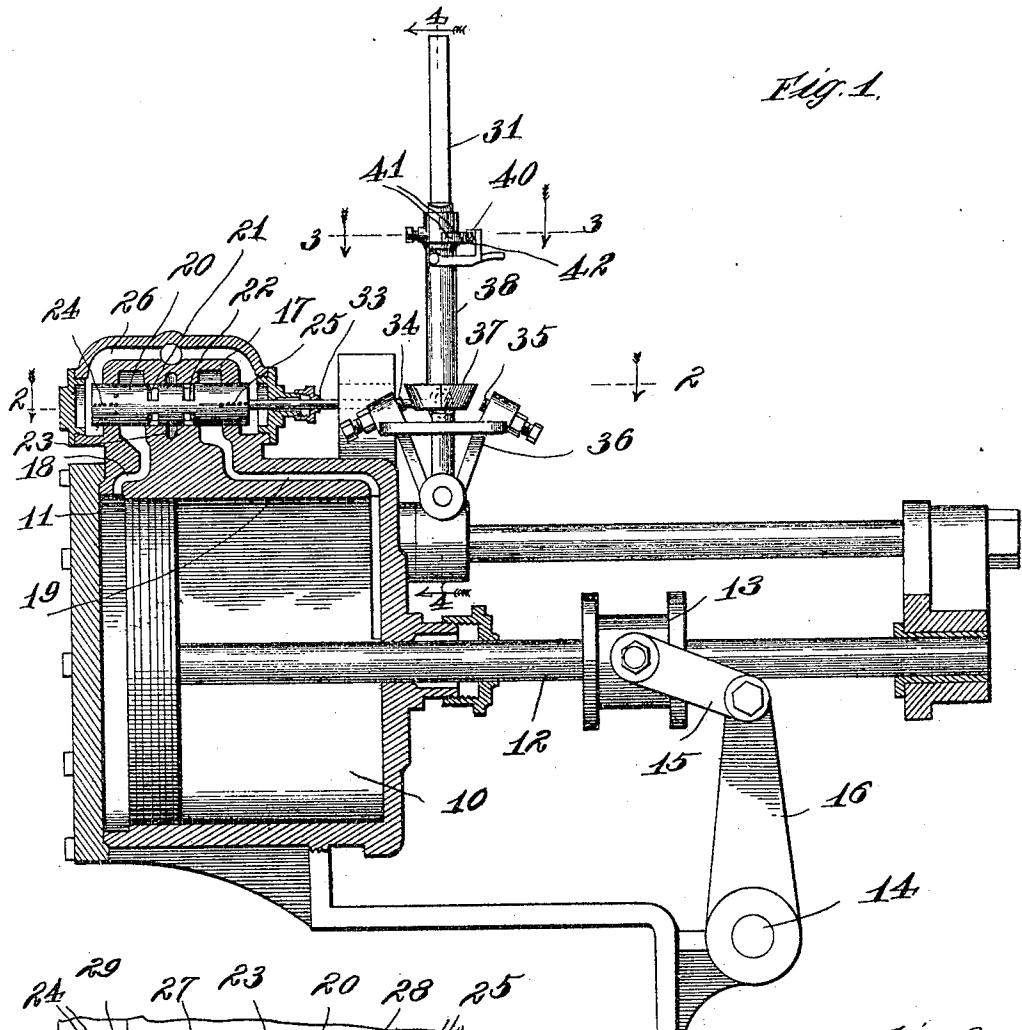
PATENTED DEC. 19, 1905.

DE WITT C. PRESCOTT.

ENGINE VALVE.

APPLICATION FILED APR. 20, 1905.

2 SHEETS—SHEET 1.



Witnesses.

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2 SHEETS-SHEET 2.

Fig. 3.

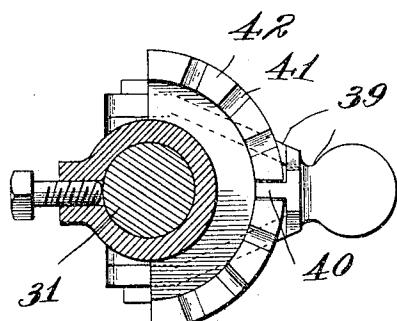


Fig. 4.

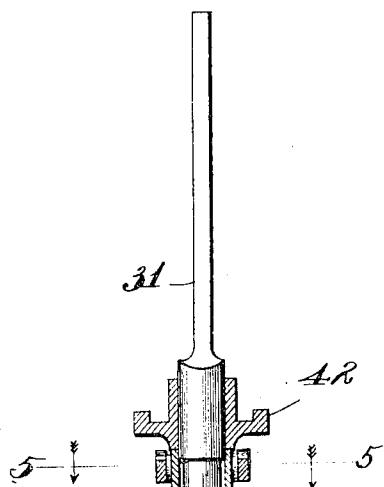
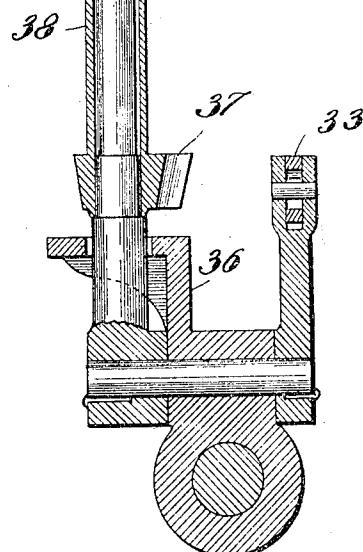
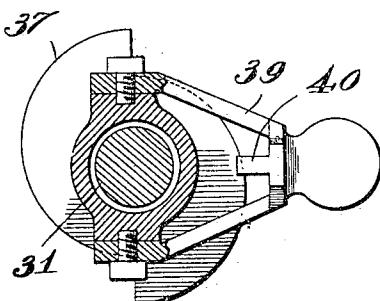


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

DE WITT C. PRESCOTT, OF CHICAGO, ILLINOIS.

ENGINE-VALVE.

No. 807,865.

Specification of Letters Patent.

Patented Dec. 19, 1905.

Application filed April 20, 1905. Serial No. 256,527.

To all whom it may concern:

Be it known that I, DE WITT C. PRESCOTT, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Engine-Valves, of which the following is a specification and which are illustrated in the accompanying drawings, forming a part thereof.

This invention relates to that class of engine-valves which regulate the action of the engine by means of a restricted exhaust-passage, and particularly in which the regulation may be varied in accordance with the load.

The invention is illustrated in connection with the valve which was made the subject of Letters Patent No. 745,520, granted to me December 1, 1903.

The objects of the invention are to provide a differential regulation for the two movements of a piston having differentiated face areas and to provide improved means for varying the movement of the valve in order to vary the regulation to correspond with the load.

The invention consists in the mechanism hereinafter described and which is illustrated in the accompanying drawings, in which—

Figure 1 is a detail side elevation of a reciprocating steam-engine, the valve mechanism being shown in longitudinal section. Fig. 2 is a plan view, partly in section, of the valve mechanism and the controlling device, taken on the line 2 2 of Fig. 1. Fig. 3 is a detail section on the line 3 3 of Fig. 1. Fig. 4 is a detail section on the line 4 4 of Fig. 1, and Fig. 5 is a detail section on the line 5 5 of Fig. 4.

The cylinder of a reciprocating steam-engine is represented at 10, its piston at 11, its piston-rod at 12, its cross-head at 13, and the engine is shown as connected with a rocker-shaft 14 by means of a link 15, leading from the cross-head 13 to a crank-arm 16 on the shaft. This arrangement of the parts is such as may be used in connection with the set-works on sawmill-carriages.

The steam-chest is shown at 17 and is in communication with the opposite ends of the cylinder through the ducts 18 and 19. A reciprocating cylindrical valve 20 fits within the chamber of the steam-chest and is provided with ports 21 22, adapted to bring the live-steam chamber 23 of the steam-chest alternately into communication with the ducts

18 19 and with ports 24 25 adjacent its ends, which register alternately with the same ducts and bring them into communication with the exhaust-chamber 26 of the steam-chest. The valve 20 is hollow, and its chamber is separated by two partitions 27 28, located one between each end of the valve and the ports 21 22, respectively.

The exhaust-ports 24 25 of the valve 20 are arranged in series extending longitudinally as to the valve, so that as the valve is shifted these ports are brought into register with the cylinder-ducts, and hence the exhaust is gradually opened.

In an engine of the type shown in which there is employed a piston-rod, as 12, leading from one face only of the engine-piston, the two faces differ in superficial area, and it is found in practice that as heretofore constructed a valve of the form described has provided an unequal control of the two strokes of the engine because of the difference of pressure on the two faces of the piston. One of the purposes of this invention is to provide for uniform control of the two strokes of such a motor, and this is accomplished by differentiating the exhaust-ports of the valve proportionately with the differentiation of the two faces of the piston. To this end an additional port, as 29, is provided in that end of the valve which co-operates with the larger face of the piston, such port being substantially in line with the inner ports of the series 24. If necessary, the port 29 may be supplemented by one or more additional ports, as shown at 30. The area of the port 29 or the combined area of the several supplemental ports is such as to insure the same degree of restriction of the exhaust from the larger face of the piston as from its smaller face. The valve 20 is controlled by a hand-lever 31, pivoted to a bracket 32, which may be secured to the cylinder 10, the hand-lever being connected with the valve by means of a valve-stem 33.

The valve-lever oscillates between fixed and preferably adjustable stops 34 35, carried by a bracket-frame 36, rising from the bracket 32. In the mechanism shown in my former patent, No. 745,520, the throw of the valve was varied by means of a wedge-block sliding longitudinally upon the hand-lever between the fixed stops. In the present instance there is used in place of the wedge-block a double-convolute cam-block 37,

mounted upon a sleeve 38, rotatably mounted on the shaft of the lever 31 and located in line with the stops 34 35. The angular position of this cam - block determines the range of movement of the hand-lever and is itself controlled by means of a handpiece 39, pivoted to the upper end of the sleeve and carrying a finger 40, which plays over and is adapted to engage the notches 41 of a quadrant 42, fixed to the hand-lever 31.

In use, for example, in connection with the set-works of a sawmill-carriage the operator varies the movement of the valve in accordance with the variations in the load. When a large log is mounted upon the carriage, he raises the handpiece 39 to disengage its finger 40 from the quadrant 42 and turns the cam-block 37, so that its minimum diameter is in line with the stops 34 35. The valve then being thrown, its exhaust-ports will be opened to allow the free escape of the steam, and the engine therefore responds to the full pressure of the live steam upon the face of its piston. As the log is reduced during the sawing operation the cam-block 37 is moved from time to time to increase its diameter in line with the fixed stops, thereby gradually reducing the throw of the valve, and consequently increasingly restricting the exhaust, and thus reducing the effective pressure upon the face of the piston and correspondingly reducing the power of the engine.

I claim as my invention—

1. The combination with a reciprocating steam-engine having the faces of its piston differentiated in area, of a valve for controlling the admission and exhaust of steam to and from the cylinder, such valve having restricted exhaust-ports differentiated in area proportionate with the difference in area of the two faces of the piston.

2. In combination, a reciprocating steam-engine the piston of which has unequal faces; and a valve for controlling the admission and exhaust of steam to the engine, the exhaust-ports of such valve being arranged to open more gradually than its induction-ports, and being relatively differentiated to correspond

with the relative difference in the piston-faces.

3. In combination, a reciprocating steam-engine the piston of which has unequal faces; a valve for controlling the admission and exhaust of steam to the engine, the exhaust-ports of such valve being arranged to open more gradually than its induction-ports, and being relatively differentiated to correspond with the relative difference in the piston-faces, and a lever for controlling the valve and having a variable range of travel.

4. In combination, an engine-valve having its exhaust-ports arranged to open gradually; a valve-lever for controlling the valve; stops for limiting the movement of the lever; a double-swell cam mounted on the lever in line with the stops; and means for oscillating the cam about the lever.

5. In combination, an engine-valve having its exhaust-ports arranged to open gradually; a valve-lever for controlling the valve; stops for limiting the movement of the lever; a double-swell cam mounted on the lever in line with the stops and being movable about the lever; and a lever for actuating the cam.

6. In combination, an engine-valve having its exhaust-ports arranged to open gradually; a valve-lever for controlling the valve; stops for limiting the movement of the lever; a double-swell cam mounted on the lever in line with the stops and being movable about the lever; a lever for actuating the cam; a notched quadrant carried by the valve-lever; and a latch carried by the cam-actuating lever and coöperating with the quadrant.

7. In combination, an engine-valve having its exhaust-ports arranged to open gradually, a valve-lever; fixed stops in the path of the lever; a double-convolute cam sleeved and revoluble on the lever; a notched quadrant fixed on the lever; and a lever pivoted to the sleeve of the cam and having a finger coöperating with the quadrant.

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Witnesses:

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