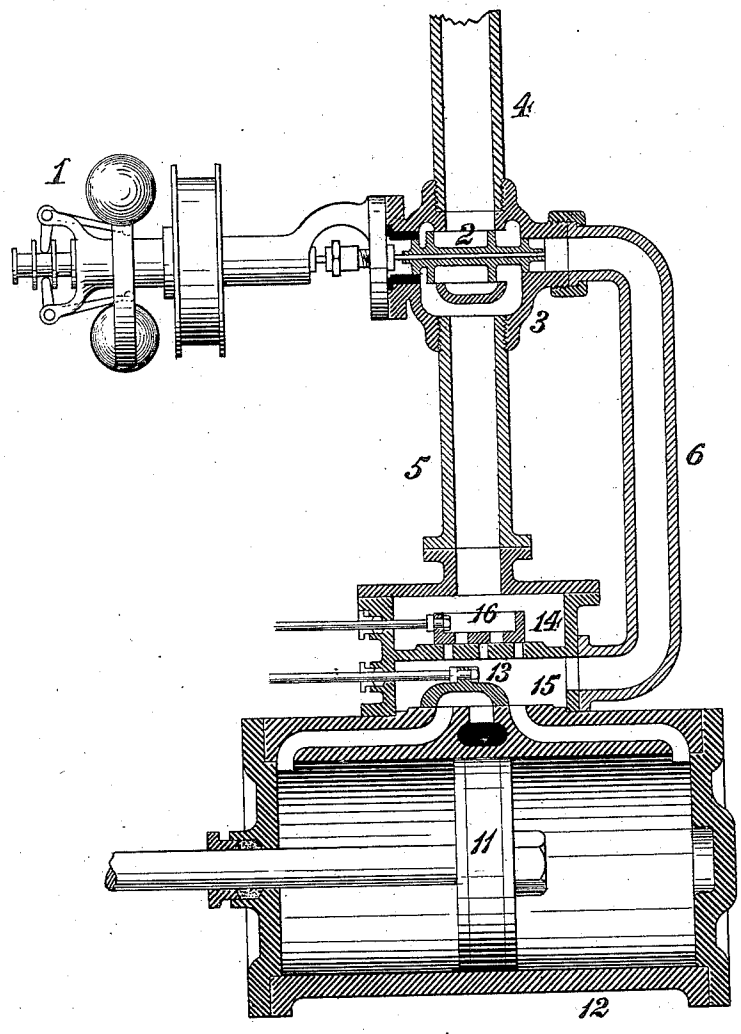
(No Model.)

G. WESTINGHOUSE, Jr.

REGULATING STEAM SUPPLY TO ENGINES.

No. 309,592. Patented Dec. 23, 1884.



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REGULATING STEAM-SUPPLY TO ENGINES.

SPECIFICATION forming part of Letters Patent No. 309,592, dated December 23, 1884.

Application filed June 6, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Regulating Steam-Supply to Engines, of which improvements the following is a specification.

In the accompanying drawing, which forms part of this specification, the figure is a longitudinal central section through the cylinder and steam-chest of an engine adapted to work steam expansively in a single cylinder, illustrating the application of my invention thereto.

In an application for Letters Patent filed by me March 12, 1884, Serial No. 124,145, I have set forth a method of and means for enabling an increase of power above that normally and usually exerted, to be developed in the operation of a steam-engine in accordance with and as required by additional resistance encountered in the performance of temporarily increased duty imposed from time to time upon the engine, by effecting an increased supply of steam to two or more pistons thereof upon the application thereto of duty or resistance greater than its maximum under normal or ordinary conditions of operation. Under my present invention I render such increase of power practicable in a single-cylinder expansively-working or cut-off engine by automatically supplying the piston thereof with steam throughout its entire stroke additionally to its normal supply for a fraction of its stroke under and in accordance with the degree of additional duty imposed, regulating such increased supply by and terminating it with such additional imposition of duty.

In the practice of my invention I provide a governor or regulator, 1, of any suitable construction, and connect the same with a governor-valve, 2, fitting seats in a valve-chest, 3, and controlling the admission of steam from a main supply-pipe, 4, to a main steam-passage, 5, leading to the chest 14 of the independent cut-off or expansion valve 16 of the engine, and an auxiliary or supplemental steam-passage, 6, leading to the chest 15 of the main valve 13. The openings through which steam from the main and the supplemental passages obtains access to the cylinder are therefore governed by the cut-off and by the main valves, respectively, and the latter is wholly independent of the cut-off valve. Steam is supplied to and exhausted from the piston 11 of the cylinder 12 by the main valve 13, and in the operation of the engine within the limit of its ordinary or normal capacity all the steam which is admitted thereto is cut off at a determined period in the stroke, which period may be either fixed or variable by the cut-off or expansion valve 14. The capacity of the main steam-passage 5 and the relation of the governor-valve thereto are such that when said passage is fully opened to the steam-pipe 4 by the movement of the governor-valve the maximum quantity of steam required in the normal operation of the engine shall be supplied to the cut-off-valve chest through the main steam-passage 5, and the governor-valve is so set relatively to the opening of the supplemental steam-passage 6 that said passage shall not be opened to the steam-pipe until after the maximum admission of steam through the passage 5 shall have been effected.

Upon the application of duty or resistance greater than that within the capacity of the engine under the maximum supply afforded through the passage 5 and worked expansively, the continued traverse of the governor-valve, effected by the action of the increased resistance upon the governor, opens the supplemental steam-passage 6 to the steam-pipe 4 to a greater or less degree proportionate to the resistance, and affords a further supply of steam from the main steam-pipe 4 through the passage 6 to the main valve-chest, which further supply acts upon the piston 11 during the full stroke thereof, and correspondingly increases the power of the engine during the continuance of the additional duty imposed, upon the cessation or removal of which the governor closes the supplemental passage 6 and continues its regulation for the normal operation of the engine by controlling the main passage to the cut-off-valve chest in the usual manner.

I claim herein as my invention—

1. The improved method of increasing the development of power from steam-engines, which consists in affording a supply of steam for the full stroke of the engine-piston, in addition to the ordinary supply for a fraction of the stroke, said additional supply being effected in accordance with the application of an increased duty or resistance to the engine and by regulating mechanism actuated in and by said application, substantially as set forth.

2. The combination, with a steam-engine adapted to work expansively or receive steam for a portion only of its piston-stroke when in ordinary or normal operation, of a governor, a governor-valve, and main and auxiliary passages, each controlled by said valve and leading, respectively, from the chest thereof to a delivery-opening controlled by the cut-off mechanism and to a similar opening independent of said mechanism, substantially as set forth.

In testimony whereof I have hereunto set my hand.

GEO. WESTINGHOUSE, JR.

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