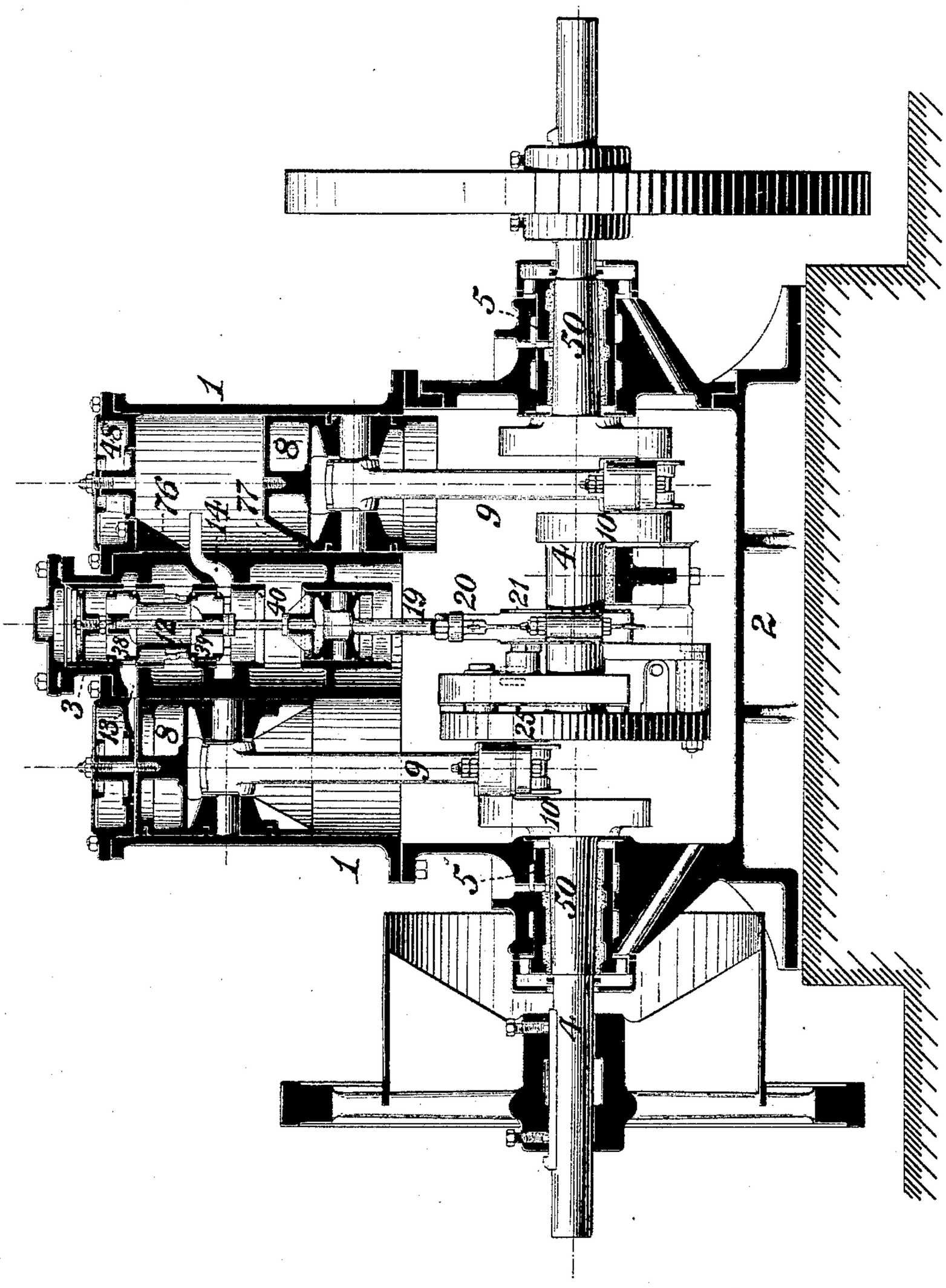
(No Model.)

H. H. WESTINGHOUSE.

REDUCING CLEARANCE IN STEAM CYLINDERS.

No. 327,630. Patented Oct. 6, 1885.



WITNESSES:

C. M. Clarke

Dennis S. Wolcott

INVENTOR

H. H. Westinghouse.

By J. Stanley Bell.

ATTORNEY

UNITED STATES PATENT OFFICE.

H. HERMAN WESTINGHOUSE, OF NEW YORK, N. Y., ASSIGNOR TO THE WESTINGHOUSE MACHINE COMPANY, OF PITTSBURG, PA.

REDUCING CLEARANCE IN STEAM-CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 327,630, dated October 6, 1885.

Application filed August 15, 1885. Serial No. 174,478. (No model.)

To all whom it may concern:

Be it known that I, H. HERMAN WESTINGHOUSE, of the city, county, and State of New York, have invented certain new and useful Improvements in Means for Reducing Clearance in Steam-Engine Cylinders, of which improvements the following is a specification.

My invention more particularly relates to steam-engines of the class in which a single main or distribution valve working in a chest located between two single-acting cylinders performs the distribution functions of both of said cylinders; and its object is to reduce, as far as practicable, the clearance or waste-port space requiring to be filled with and emptied of steam at each revolution.

To this end my invention, generally stated, consists in the combination of a steam-cylinder having a clearance-reducing block fixed to its head, a piston which is laterally recessed in correspondence with the face of the reducing-block, and a distribution-valve governing a port leading into the cylinder adjacent to the end of the reducing-block. The improvements claimed are hereinafter fully set forth.

The accompanying drawing is a vertical longitudinal central section through a steam-engine embodying my invention.

My improvements are herein shown as applied in an engine which otherwise accords substantially with that set forth in Reissued Letters Patent No. 10,603, granted and issued to the Westinghouse Machine Company, as my assignee, May 26, 1885. Two single-acting cylinders, 1 1, between which is interposed a valve chest or chamber, 3, are secured upon the top of a closed crank case or receptacle, 2, having end bearings, 5, in which are mounted the journals 50 of a crank-shaft, 4. The pistons 8 8 of the cylinders 1 1 are coupled by connecting-rods 9 9 to crank-pins set oppositely or at an angle of one hundred and eighty degrees upon a pair of double cranks, 10, on the crank-shaft 4. Steam supplied to the valve-chamber 3 from the boiler is supplied to and exhausted from the upper ends of the cylinders 1 1 by a main or distribution valve, 12, working in a sleeve or bushing, 40, in the valve-chamber, said valve having an upper and a lower steam admission and exhaust piston, 38 39, connected by a hollow or tubular body portion, the upper piston, 38, governing a port, 13, leading from the upper portion of the valve-chamber into the left-hand cylinder, and the lower piston, 39, governing a port, 14, leading from the valve-chamber at a lower level than the port 13 into the right-hand cylinder. The valve is actuated by an eccentric, 20, to the strap 21 of which it is coupled by an eccentric-rod, 19.

My present invention is designed to effect a reduction of clearance or waste space in the lower port, 14, which cannot, like the upper port, 13, be led directly into the cylinder by reason of the position of its valve-chest opening relatively to the lower valve-piston, 39, by which it is governed. To this end, in lieu of carrying the port 14 to or near the top of the cylinder, as in prior constructions, I so far reduce its length as to bring the lower edge of its opening into the right-hand cylinder 1 at or near the level of the upper packing-ring of the piston 8 thereof when said piston is at the upper end of its stroke. The space adjacent to the shell of the cylinder, between the upper edge of the port 14 and the cylinder-head 48, is filled up by a clearance-reducing block, 76, which may be cast integral with or secured to the cylinder-head 48 upon its inner side. The top of the piston 8 is cut away on one side, so as to form a lateral recess, 77, corresponding in form with the reducing-block 76, in order that the piston may clear the latter in traversing to the upper extremity of its stroke, and the face of the block 76 is outwardly and downwardly inclined or curved from its upper to its lower end, in order that the opening for admission of steam between it and the face of the recess 77 of the piston may, in the downward traverse of the piston, increase with sufficient rapidity to fulfill the demands of steam-supply. It will be seen that a material reduction of the length of the port 14 is effected by the above construction, and a corresponding economy in steam, particularly in high-speed engines, results from the consequent diminution of clearance in the port.

I claim as my invention and desire to secure by Letters Patent—

1. The combination of a steam-cylinder having a clearance-reducing block fixed to its head, and extending therefrom to or near the opening

of a steam-supply port, and a piston working in said cylinder and laterally cut away or recessed, so as to work close to and clear of said block in its traverse in the cylinder, substantially as set forth.

2. The combination of a steam-cylinder, a clearance-reducing block fixed to a head of the cylinder and having an inclined or curved face extending from said head to or near the opening of a steam-supply port, and a piston working in said cylinder and having a lateral recess inclined or curved in conformity with the face of the reducing block, substantially as set forth.

3. The combination of a pair of steam-cylinders, an intermediate valve chest or chamber, a main distribution-valve working therein, a port leading from the end of one cylinder directly or in substantially a right line into the valve-chamber and governed by a piston on one end of the valve, a port leading from the valve-chamber in position to be governed by a piston on the opposite end of the valve into the other cylinder at or near the level of the adjacent packing-ring of the piston of said cylinder when at the end of its stroke, and a clearance-reducing block extending from said port to the cylinder-head, substantially as set forth.

H. H. WESTINGHOUSE.

Witnesses:
J. SNOWDEN BELL,
G. W. WILLIAMS.