

J. H. K. McCOLLUM.
STEAM ENGINE.
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1,046,827.

Patented Dec. 10, 1912.

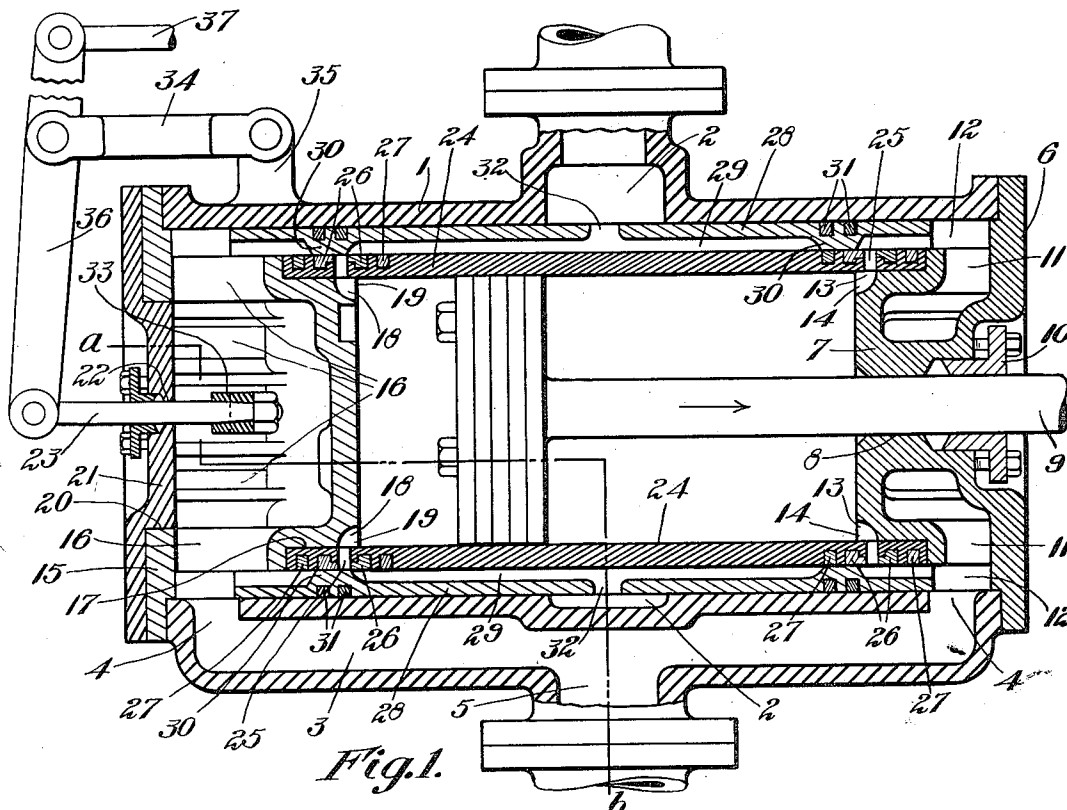


Fig. 1.

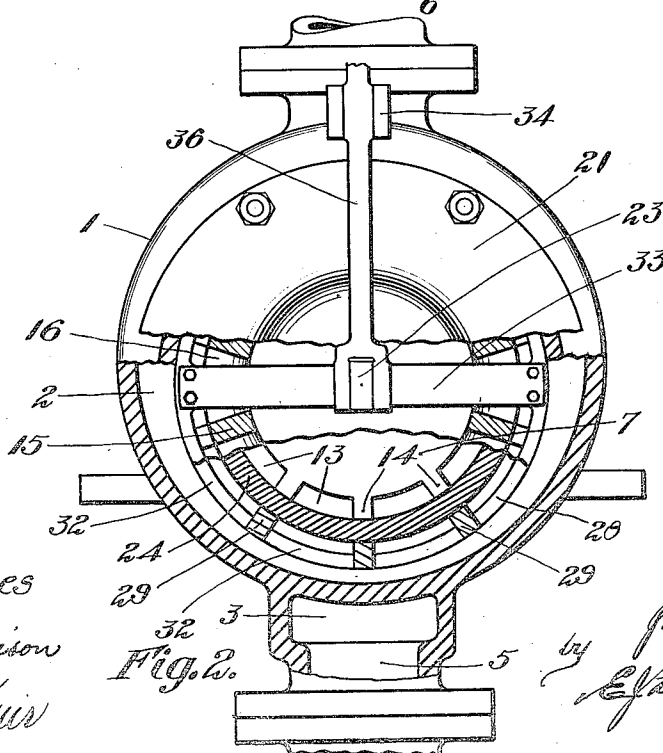


Fig. 2.

Witnesses
Attestation
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UNITED STATES PATENT OFFICE.

JAMES HARRY KEIGHLY McCOLLUM, OF TORONTO, ONTARIO, CANADA.

STEAM-ENGINE.

1,046,827.

Specification of Letters Patent.

Patented Dec. 10, 1912.

Application filed April 4, 1910. Serial No. 553,276.

To all whom it may concern:

Be it known that I, JAMES HARRY KEIGHLY McCOLLUM, a subject of the King of Great Britain, and resident of the city of Toronto, county of York, Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification.

10 The invention relates to improvements in steam engine cylinders and valves, as described in the following specification and illustrated in the accompanying drawings that form part of the same.

15 The invention consists essentially in the novel construction and arrangement of parts, whereby the exhaust steam from the cylinder is conducted through passages through the cylinder heads to the exhaust port and whereby the central or main portion of the cylinder proper is supported by the cylinder heads and whereby the cylindrical valve is operated by a single rod connection.

25 The objects of the invention are, to allow a free flow of the live steam to the cylinder ports and the exhaust steam to the exhaust ports, to obviate the difficulties incident to the machining of the valve, to provide a rigid support for the central portion of the cylinder between the rows of ports, and to devise an improved means for connecting the valve to the operating mechanism.

35 In my application Serial Number 526,255 filed November 4th 1909, I have described a particular type of cylinder and valve for steam engines and the present invention is designed to further improve that class of cylinders and valves.

40 In the drawings, Figure 1 is a longitudinal vertical sectional view of a cylinder constructed in accordance with this invention. Fig. 2 is an end view shown partly in section, the section being taken through the line *a-b* Fig. 1.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, 1 is the outer cylinder casing having the eccentrically arranged steam passage 2 formed intermediate of its length and the exhaust passage

3 communicating with the exhaust ports 4 opening inwardly at each end and leading to a common exhaust 5.

6 is the inner cylinder head closing one end of the casing 1 and having an inwardly projecting central portion 7 formed with a central opening 8 for the piston rod 9 and a stuffing box 10.

11 are a plurality of passages extending through the outer wall of the portion 7 of the head and communicating with an annular passage 12 formed between the outer wall of said central projection and the inner wall of the outer casing 1, said annular passage communicating with the exhaust port 4 at one end of said outer casing.

13 are ports formed in the innermost reduced end of the head 6 opening inwardly into the cylinder from the end of said head and outwardly through the side wall thereof and separated by a plurality of ribs 14.

15 is the outer cylinder head, here shown formed in two parts. The main portion is formed with a plurality of passages 16 opening through the side wall thereof and an annular recess 17 corresponding with the recess formed by the reduced end of the head 6 and ports 18 and ribs 19 corresponding with the ports 13 and ribs 14 in the head 6. The member 15 has a circular opening 20 at the outer end thereof and said opening is closed by the cap 21, said cap having a small central opening 22 therethrough for the valve rod 23.

24 is a cylindrical casing encircling the reduced ends of the cylinder heads 6 and 15 and extending therebetween and forming the cylinder proper, the said cylinder having the circumferential rows of ports 25 arranged at each end thereof, said ports being adapted to register with the ports 13 and 18 respectively in the said heads.

26 are L-shaped packing rings inserted in suitable grooves in the outer wall of the cylinder 24 and having their adjacent edges arranged flush with the sides of the ports 25, thus bringing the actual point of cut off of the steam right to the edge of the port.

27 are rings arranged to the outside of the rings 26.

28 is the cylindrical valve formed with a

plurality of inwardly extending radially arranged ribs 29 resting on the periphery of the cylinder 24.

30 are annular ring portions formed adjacent to each end of the valve 28 and extending inwardly from the outer wall thereof and engaging the periphery of the cylinder 24 and forming the means for cutting off the ports 25.

31 are packing rings inclosed in suitable recesses in the outer wall of the valve 28 adjacent to the ends.

32 are a plurality of ports extending through the outer shell of the valve 28 and communicating with the steam passage 2.

The outer shell and inwardly extending ribs of the valve 28 project beyond the cut off portions 30 of said valve to hold the packing rings securely in place, said ribs extending inwardly from the outer shell portion and continuously engaging the said rings.

33 is a cross bar secured at the ends to one end of the valve 28 and extending through the passages 16 in the head 15. The valve rod 23 is rigidly secured to the cross bar 33 and extends outwardly through the orifice 22 and is suitably packed.

34 is a link pivotally connected to a lug 35 extending from the outer casing 1.

36 is a floating lever pivotally connected to the outer end of the valve rod 23 and to the pivotal link 34.

37 is a rod pivotally secured to the outer end of the lever 36 and adapted to be operatively connected with a suitable valve gear.

In the operation of this device, the steam flows from the inlet passage 2 through the ports 32 in the valve 28 and as the said valve 28 reciprocates on the cylinder through the operation of the rod 23 and its co-acting parts, the ports 25 in the cylinder are alternately uncovered, allowing the inflow of the steam therethrough to the cylinder.

The valve 28 is shown in the drawings in the position of just cutting off the inlet at the outer end of the cylinder. The piston continues its travel in the direction indicated by arrow and the exhaust steam flows out through the ports at the opposite end of said cylinder and through the passages in the head 6 to the exhaust port 4 at that end. The valve continues its movement closing off the exhaust port and opening the inlet at the forward end of the cylinder, simultaneously opening the ports at the opposite end to communicate with the exhaust passages through the head 15.

The movement and operation of the valve is exactly the same as in my former application but I have arranged the present construction to allow a free flow of exhaust steam to the exhaust ports through the hollow cylinder heads and the said heads are

arranged to extend inwardly past the ports 25 supporting the main portion of the cylinder,—thereby relieving any undue strain on the members connecting the ends of said cylinder with the main portion, that is to say, the central part is now directly supported instead of being carried by thin bridges as was the case in my former application. The present construction of a hollow head allows the use of a cross bar connection to connect the valve to a single operating valve rod.

What I claim as my invention is:—

1. In a steam engine, a cylinder having a circumferential row of ports adjacent to each end, heads closing the ends of said cylinder and extending inwardly beyond the rows of ports and having notched ports in the end edges leading to said cylinder ports, said cylinder heads having transverse passages therethrough, a casing inclosing said cylinder and forming an annular valve chamber around said cylinder and having an inlet centrally arranged and exhaust passages at the ends communicating with the transverse passages of said cylinder heads, and a sleeve valve operating between said cylinder and casing and hollowed on the inner side at the center and ends to lead the steam to and from the cylinder ports.

2. In a steam engine, a cylindrical casing having an inlet centrally arranged and exhaust ports at the ends, heads closing the ends of said casing and having rigid inward projections of smaller diameter than the interior of said casing, a cylinder encircling the inner ends of said projections and supported rigidly between said heads and having a circumferential row of ports at each end, spring packing rings arranged in the periphery of said cylinder at each side of said rows of ports, a sleeve valve encircling said cylinder and having inwardly projecting annular portions adjacent to the ends engaging the periphery of said cylinder and inwardly projecting radial ribs extending longitudinally from end to end thereof and adapted to retain said packing rings in place, said valve having a circumferential row of ports therethrough mid-way of its length communicating with the inlet port to said outer casing, and spring packing rings arranged in the periphery of said sleeve valve adjacent to each end and engaging the inner wall of said cylinder.

3. In a steam engine, a cylindrical casing having inlet and exhaust openings, cylinder heads rigidly secured to said casing and having inwardly projecting portions of smaller diameter than the interior of said casing and formed with radial passages opening into the annular spaces between said projections and the inner wall of said casing, a cylinder rigidly supported from

said inward extensions and extending there-
between and having circumferential rows
of ports adjacent to the ends, a sleeve valve
slidably arranged between the periphery of
5 said cylinder and the inner wall of said
outer casing, a cross bar rigidly connected
to one end of said valve and extending
through the radial passages in one of said
heads, a valve rod rigidly connected to said
10 cross bar and extending through the cylin-

der head, and means for reciprocating said
valve rod.

Signed at the city of Toronto, county of
York, Province of Ontario, in the Dominion
of Canada, this 14th day of February, 1910. 1

JAMES HARRY KEIGHLY McCOLLUM.

Witnesses:

H. DENNISON,
E. HERON.