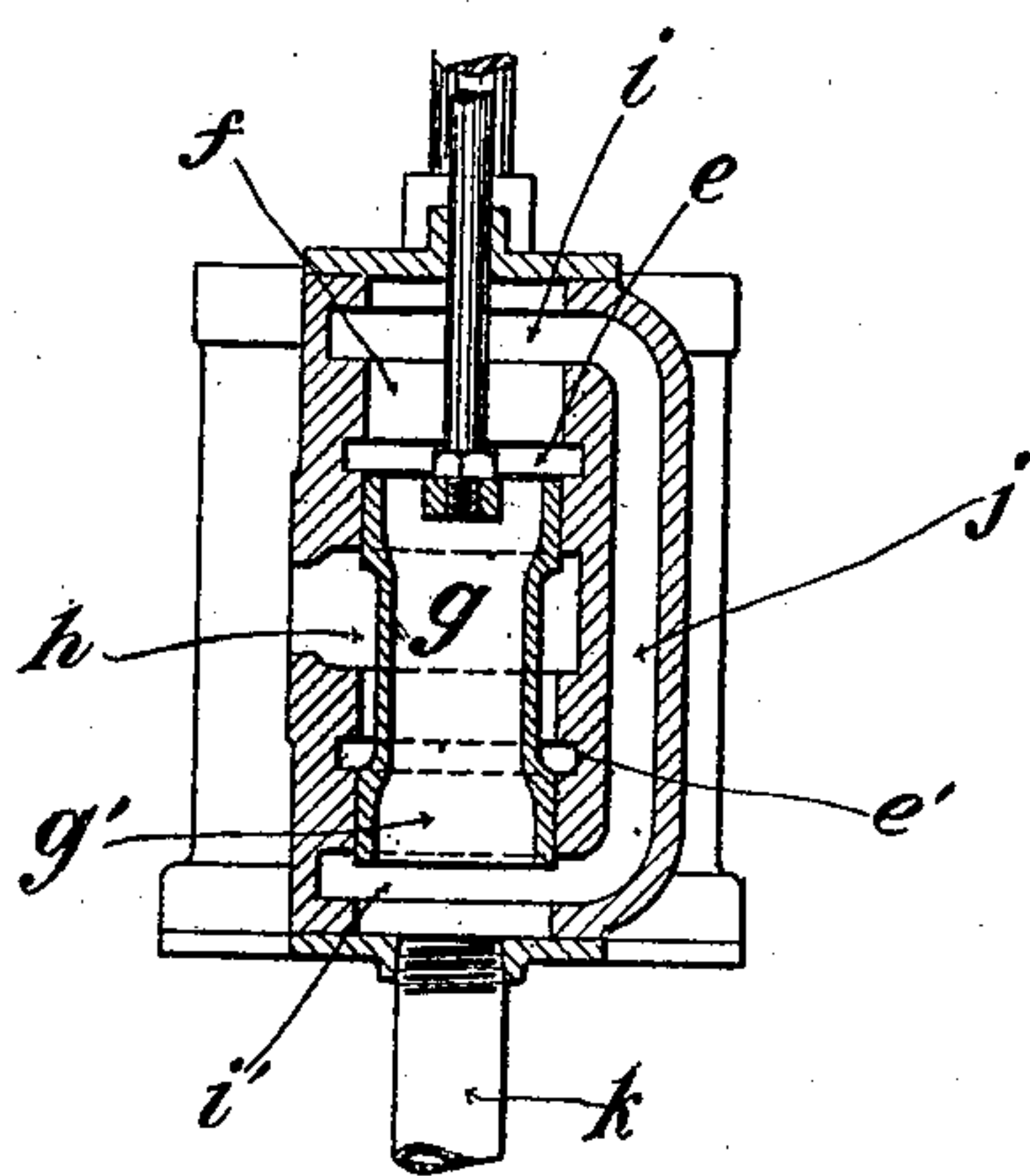
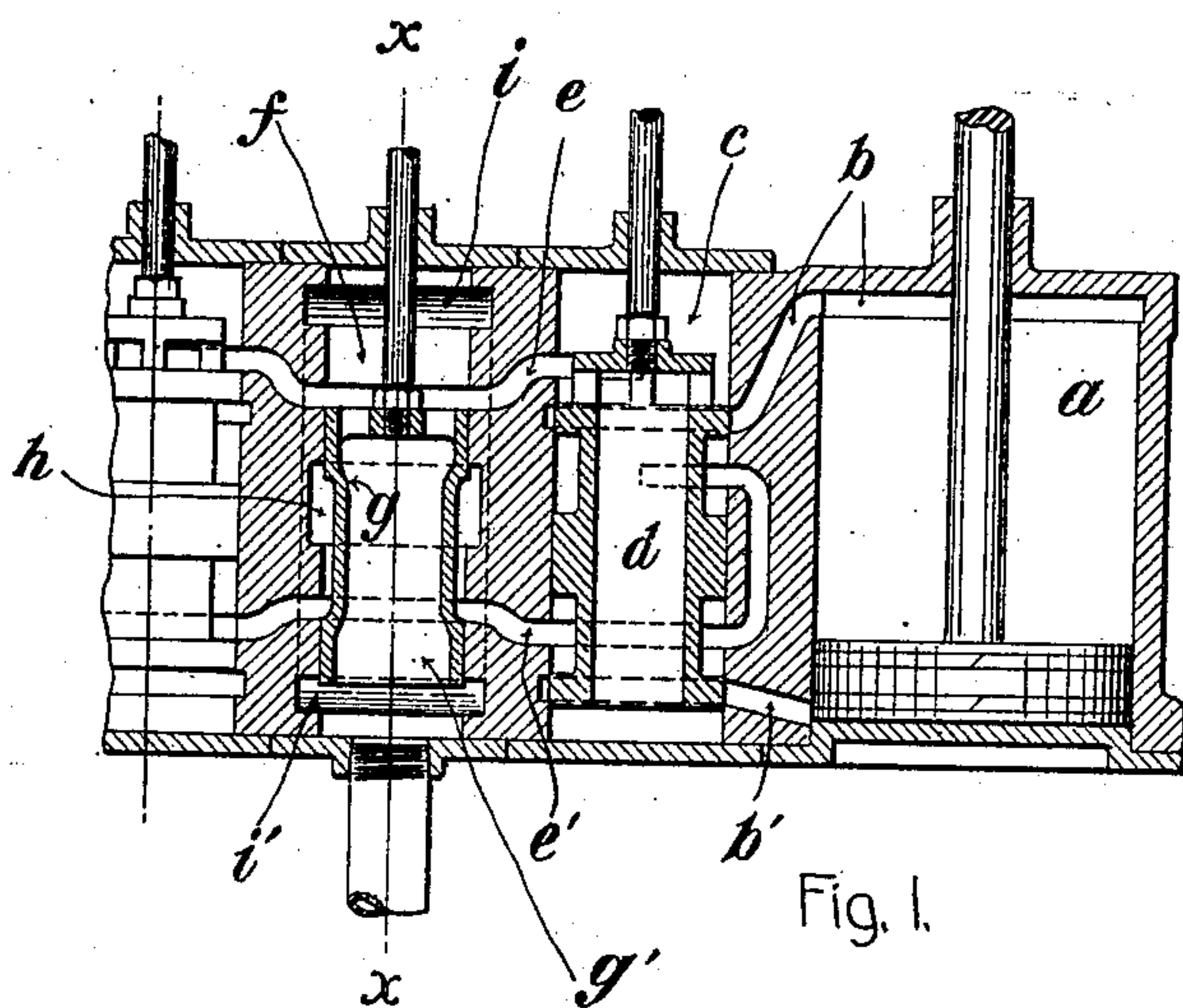


No. 887,245.

PATENTED MAY 12, 1908.

J. GARDINER.  
REVERSING VALVE FOR STEAM ENGINES.

APPLICATION FILED MAR. 4, 1907.



Witnesses.

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# UNITED STATES PATENT OFFICE.

JOHN GARDINER, OF PORTLAND, OREGON.

## REVERSING-VALVE FOR STEAM-ENGINES.

No. 887,245.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed March 4, 1907. Serial No. 360,578.

*To all whom it may concern:*

Be it known that I, JOHN GARDINER, a citizen of the United States, and a resident of Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Improvement in Reversing-Valves for Steam-Engines, of which the following is a specification, reference being had to the accompanying drawings as constituting a part thereof.

This invention relates to reversing valves of the type of sawmill engines which have become favorably known and are now extensively used, and it has for its object to improve the reversing valve so as to remove certain serious objectionable features thereof. In short, in the reversing valve of the engine referred to, the same was not well balanced, and as a result of such defect, its movement at times was very sudden, which sudden movement of the reversing-valve, being transmitted through its connections to the operating lever, was a constant menace to the safety of the operator.

In order to more readily understand the nature of my improvements, I will in the first place explain the drawings; Figure 1, thereof, represents a partial plan section, of an engine comprising duplicate cylinders, slide-valves controlling the admission of the steam in the cylinder, and a central reversing-valve controlling the passage of steam to the respective slide-valves; and Fig. 2 is a vertical longitudinal section, taken on a line  $x-x$  of Fig. 1.

The cylinder,  $a$ , (the duplicate of which would appear on the left side, if the drawing were extended in that direction), has the usual ports,  $b$ ,  $b'$ , connecting the valve-chamber  $c$ , controlled by a valve  $d$ , and the chamber  $c$  is connected by ports,  $e$ ,  $e'$ , with the chamber  $f$ , of the reversing valve  $g$ . The live steam is admitted through port  $h$  into the reversing valve-chamber  $f$ , and the exhaust steam is exhausted from the ends thereof, through ports,  $i$ ,  $i'$ , connected by a passage  $j$ , and discharges through exhaust-pipe  $k$ .

As heretofore constructed, the reversing-valve  $g$  was not made as shown in the drawings, but comprised two solid pistons, connected together, and consequently the exhaust steam from the upper end of the reversing-valve chamber had no other outlet than the passage  $j$  to the exhaust-pipe

$k$ . Now, in steam engines of the type referred to, full steam pressure is carried practically to the end of the stroke of each piston, and, in consequence, the pressure of the exhaust steam in the reversing-valve chamber is approximately that of live steam, at the instant of exhaust. And therefore, when the steam was exhausted from the upper end of the reversing-valve chamber, the passage  $j$  offered such frictional resistance thereto as to cause an unequal pressure above and below the reversing-valve, producing the sudden movement of the latter commonly known as a "kick." To remedy this condition, I have made my reversing-valve  $g$  with a central passage-way  $g'$ , connecting both ends of the reversing-valve chamber, and which passage-way, leading direct to the exhaust-pipe  $k$ , acts as an auxiliary to the passage  $j$  and causes the pressure at both ends of said chamber to be equal at all times; and in consequence the shifting of the reversing-valve by the operator is readily accomplished; the valve moving easily, being freed from any interfering pressure of steam.

I claim:

1. In a steam engine, the combination with a valve chamber formed with inlet and outlet ports, a slide valve in said chamber, a reversing valve chamber having ports communicating with the ports of the other mentioned valve chamber, said reversing valve chamber having two exhaust ports, a hollow reversing valve in the reversing valve chamber between the two exhaust ports, said valve being open at both ends and communicating with its chamber, the wall of the reversing chamber having a passage to connect the two exhaust ports, said passage having an opening for the final exhaust of the steam at a point in alinement with the hollow reversing valve.

2. In a steam engine, the combination with a pair of valve chambers formed with inlet and outlet ports, slide valves in said chambers, a reversing valve chamber having ports communicating with the ports of the other mentioned valve chambers, said reversing valve chamber having two exhaust ports, a hollow reversing valve in the reversing valve chamber between the two exhaust ports, said valve being open at both ends and communicating with its chamber, the wall of the reversing valve chamber having a passage to connect the two exhaust



ports, said passage having an opening for the final exhaust of the steam at a point in alignment with the hollow reversing valve.

3. In a steam engine, the combination  
5 with a valve chamber formed with inlet and outlet ports, a slide valve in said chamber, a reversing valve chamber having ports communicating with the ports of the other mentioned valve chamber, said reversing valve  
10 chamber having two exhaust ports, a hollow reversing valve in the reversing valve chamber between the two exhaust ports, said

valve being open at both ends and communicating with its chamber, the wall of the reversing valve chamber having a passage to  
15 connect the two exhaust ports, said passage having an opening located at a point a greater distance from one of the exhaust ports of the reversing valve chamber than from the other  
20 of said ports for the final exhaust of the steam.

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Witnesses:

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