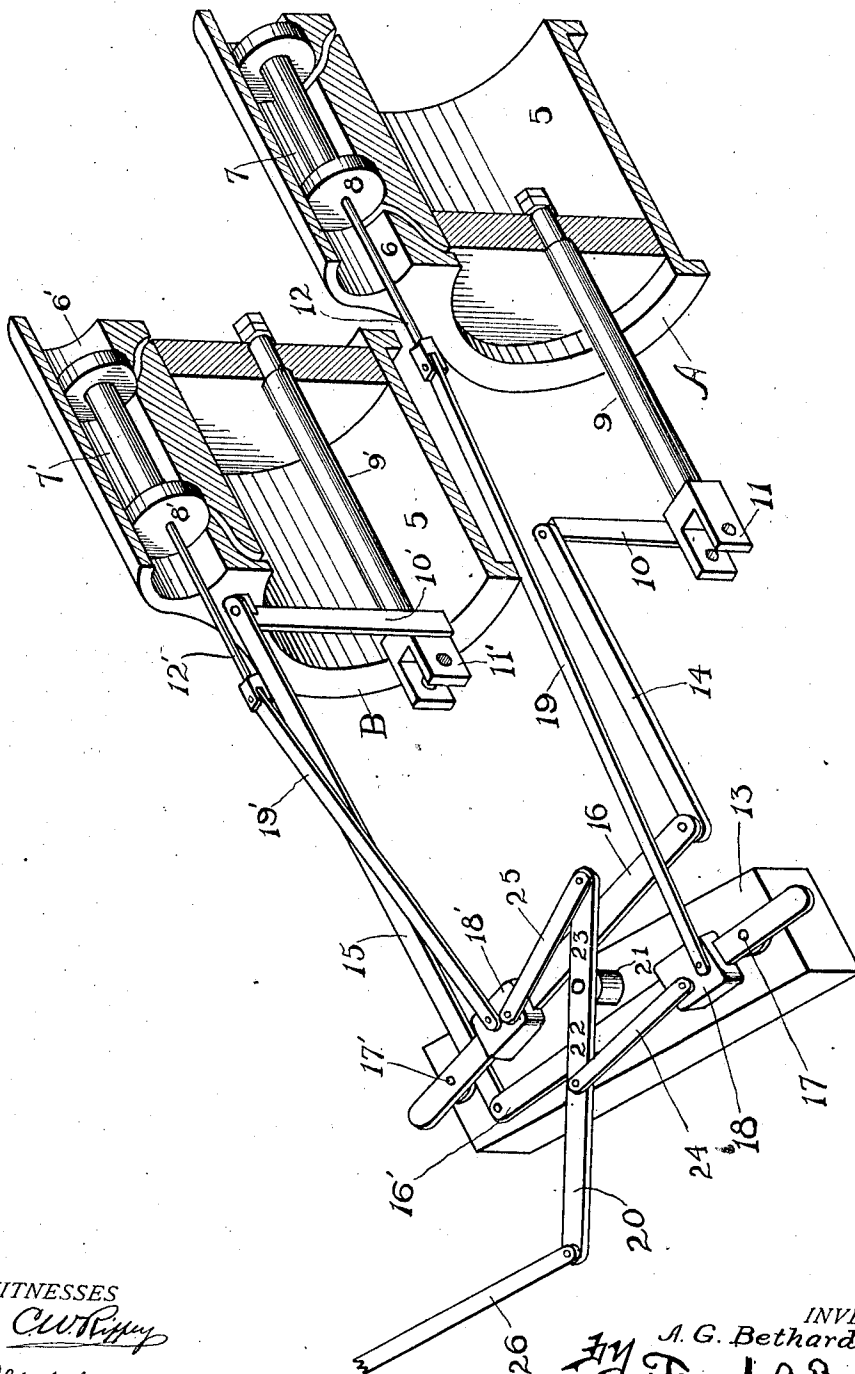


A. G. BETHARD.
DOUBLE CYLINDER ENGINE.
APPLICATION FILED DEC. 11, 1911.

1,026,198.

Patented May 14, 1912.



WITNESSES

C. W. Phipps
Effie J. James

INVENTOR

A. G. Bethard
Frank A. Butts
Attorney

UNITED STATES PATENT OFFICE.

ALBERT G. BETHARD, OF DECATUR, ALABAMA.

DOUBLE-CYLINDER ENGINE.

1,026,198.

Specification of Letters Patent.

Patented May 14, 1912.

Application filed December 11, 1911. Serial No. 665,042.

To all whom it may concern:

Be it known that I, ALBERT G. BETHARD, a citizen of the United States of America, residing at Decatur, in the county of Morgan and State of Alabama, have invented certain new and useful Improvements in Double-Cylinder Engines, of which the following is a specification.

This invention relates to double-cylinder engines, the main object of the invention being to dispense with the usual eccentrics, for reversing the engines.

The invention consists in providing means for causing the piston-rod of one engine to impart the desired throw to the valve of the other engine.

Primarily the invention is designed for use in connection with locomotives, but it is obvious that the invention could be put to various uses wherever steam engines are used.

In the accompanying drawings:—the figure represents a perspective view of the invention.

Referring more specifically to the drawings in which like reference numerals refer to corresponding parts throughout the view, 5 and 5' represent the cylinders or a portion of the cylinders of the engines A and B respectively. Each cylinder has the usual steam ports 6 6' and exhaust ports 7 7'. Valves 8 8' also of usual construction control the admission of steam from the steam chest (not shown) by means of mechanism about to be described, it being understood that I do not desire to restrict myself to the precise devices shown, as many changes in size and relative location of the parts could be made within the scope of the appended claim.

The piston rods 9 9' of each engine have a lug 10 10' rigidly secured to the respective cross heads 11 11' and valve rods 12 and 12' connected to the valves 8 8'. These lugs extend inwardly over the bed frame 13 and are pivotally connected at their inner ends to a short link 14 and a long link 15 respectively, the opposite ends of the links 14 and 15 being pivotally connected to the inner ends of rock arms 16 and 16' fulcrumed as at 17 17' to the bed frame 13. It will be noted that the fulcrum of each

rock arm is in the plane of an imaginary line drawn through the center of the cylinders 5 and cross-heads 11.

Slidably mounted on the rock arms 16 16' are a pair of sleeves 18 and 18' arranged to be reciprocated in and out past the fulcrum points 17 17' in a manner hereinafter described. Links 19 and 19' flexibly connect the slidable sleeves with the valve rods 12 and 12'.

From the foregoing it will be seen that the throw movement of the valve 8 of engine A is derived from the piston rod of the engine B through the medium of long link 15, rock arm 16', link 19 and valve rod 12, the throw movement of the engine B being derived from the piston-rod of the engine A through the medium of similar mechanism.

The reversing mechanism comprises an operating lever 26 and a bell crank 20 both fixed upon a short shaft 21, the arms 22 and 23 of the bell crank being pivoted respectively to links 24 and 25 in turn connected to sleeves 18 and 18' respectively. When the lever 26 (which may be suitably connected to the engineer's reversing lever not shown) is rocked in either direction the sleeves will be drawn inwardly toward each other past the fulcrum of the rock arms 16 and 16' or they (the sleeves) will be forced outwardly away from each other according to the direction in which the lever 19 is moved.

Having thus described my invention, what I claim is:—

In combination, an engine having a cylinder, a cylinder valve, a piston and a piston rod, means reversing the engine, comprising a rock arm pivoted to the bed frame of the engine, means for oscillating said rock arm, a sleeve on said arm, a reversing lever connected to said sleeve by a bell crank and link connection, and means connecting said sleeve with the cylinder valve.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT G. BETHARD.

Witnesses:

MATTIE M. JONES,
W. B. SHACKELFORD.