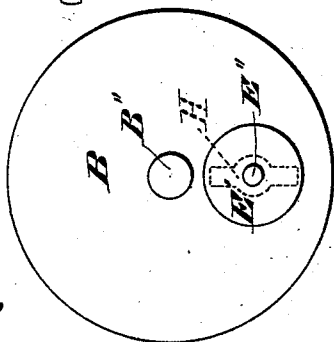
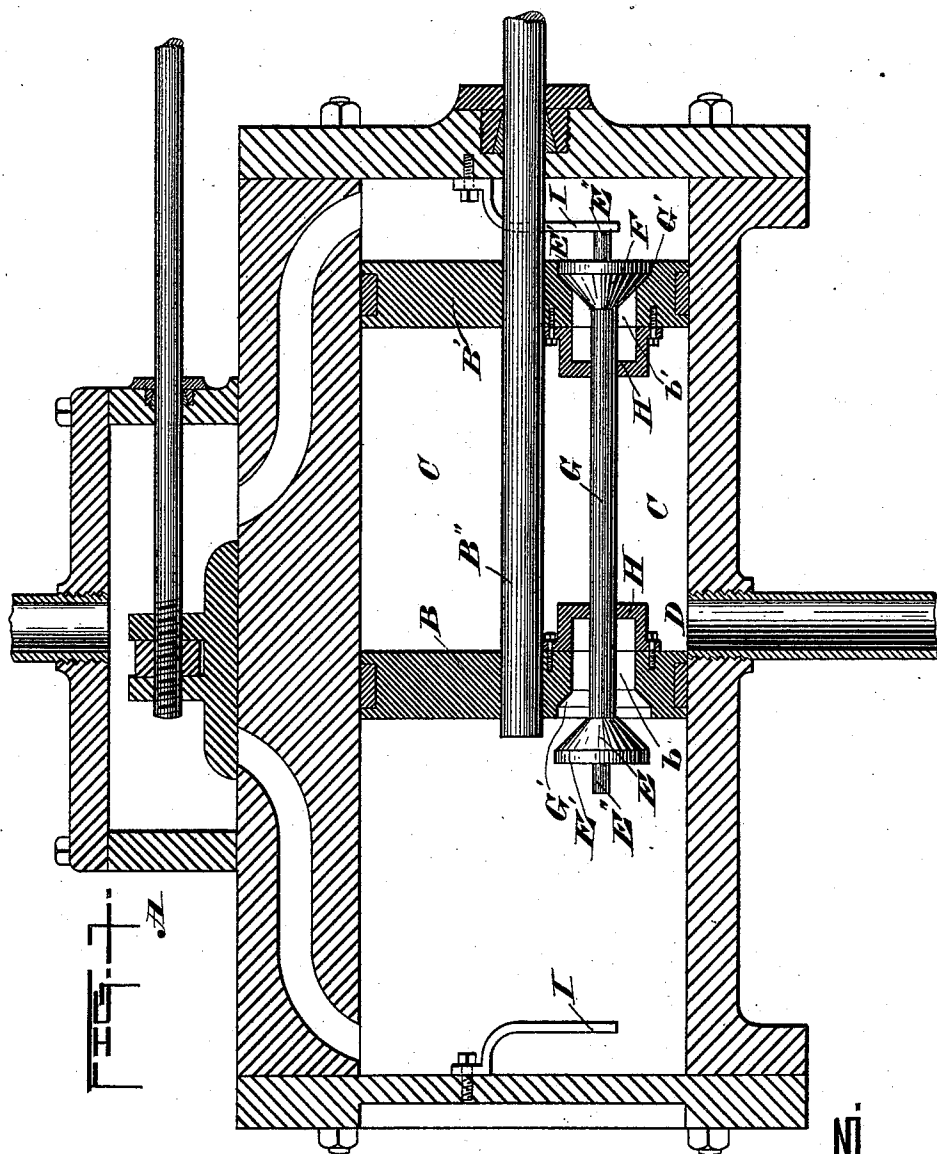


(No Model.)

N. W. BARNETT.  
STEAM ENGINE.

No. 529,581.

Patented Nov. 20, 1894.



**Witnesses:**

Frank Blair River.

W. H. Edwards

*Inventor,*

Nathan W. Barnett

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*Attorneys.*

# UNITED STATES PATENT OFFICE.

NATHAN W. BARNETT, OF MONACA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO AUGUSTA H. LINDSAY, OF SAME PLACE.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 529,581, dated November 20, 1894.

Application filed August 15, 1894. Serial No. 520,379. (No model.)

*To all whom it may concern:*

Be it known that I, NATHAN W. BARNETT, a citizen of the United States of America, residing at Monaca, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification.

This invention relates to improvements in steam-engines.

It has for its object to provide improved means for the exhaust of steam by means of valves in a double or two headed piston, and a chamber between the piston heads, to a suitable exhaust pipe, after it has performed its work.

A further object is to provide such an improved exhaust as will result in a maximum amount of power for the amount of steam used, and to prevent loss from the reaction of steam not exhausted or defectively exhausted, such as has been encountered in engines heretofore used.

For a full and clear understanding of my invention, reference is to be had to the accompanying drawings wherein corresponding letters indicate like parts in the several views, and in which—

Figure 1— is a central, longitudinal sectional view of a cylinder illustrating a double headed piston with a chamber between the piston in communication with an exhaust pipe, connected valves in the piston heads, and springs at the ends of the cylinder. Fig. 2— is an outward end view of one of the piston heads, being similarly constructed. But one head is shown. Fig. 3— is a view of an open frame guide-way.

In the drawings, A refers to a cylinder of a steam engine of ordinary construction, excepting the piston heads and exhaust mechanism, parts being broken away for better illustration.

B, B', are two piston heads suitably and centrally mounted on a piston rod B'', forming a chamber C between said heads.

D is an exhaust opening in the bottom of the cylinder near the center of the same and at all times in open communication with chamber C, as shown.

In the piston heads B, B', underneath the piston rod B'' are two circular openings *b, b'*, forming, on the outside of the heads, valve seats G' adapted to receive valves E and F on the ends of a connecting rod G and of such distance apart that when one valve contacts with its seat, the other valve is raised off its seat, as shown in Fig. 1. The outer ends of the valves have enlarged and flat surfaces E' and outward projections E<sup>2</sup> thereon in line with rod G for purposes hereinafter described.

H are open frame guide-ways, see Fig. 3, of suitable form secured to the inner surfaces of the piston heads over the openings *b, b'*, therein and in which rod G is guided in its play back and forth in the opening and closing of the valves, as hereinafter explained.

I, I, are depending steel blade springs having upper and outwardly curved ends bolted or otherwise secured to the cylinder heads near their centers, as shown. The lower ends of these springs are in direct line with rod G in the piston heads. When steam is admitted, in the ordinary way, at one end of the cylinder, it closes by its pressure on the outward surface thereof, the valve in the piston head nearer that end of the cylinder, and, at the same time, raises the valve in the other head of the cylinder off its seat by means of rod G. As soon as the double piston is forced to the end of the cylinder, a projection E<sup>2</sup> on the valve nearer that cylinder head contacts with one of the springs I. The impact and the elasticity of the spring are sufficient to reverse the position of the valves E, F, thereby opening the valve farther from this cylinder head and forming an opening for the spent steam in the cylinder to readily exhaust itself through into chamber C, and thence into pipe D. By admitting steam first at one end and then at the other end of the cylinder, the valves E and F are alternately opened and closed, as above explained, thus forming a ready and direct exhaust for the spent steam.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination in an engine, of a cylinder having springs secured to the inner surfaces of its heads, a piston rod, two piston

heads secured on said rod, a chamber between  
said heads, valves in the piston heads, a rod  
connecting said valves, open framed guide-  
ways for the latter rod on the inner surfaces  
5 of the piston heads, an exhaust pipe in the  
cylinder in communication with said cham-  
ber, projections on the valves to contact with  
the springs in the cylinder to operate the

valves when steam is admitted to the cylin-  
der, as and for the purposes set forth. 10

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

NATHAN W. BARNETT.

Witnesses:

JOHN E. SCHMIDT,

JOHN MITCHELL.