

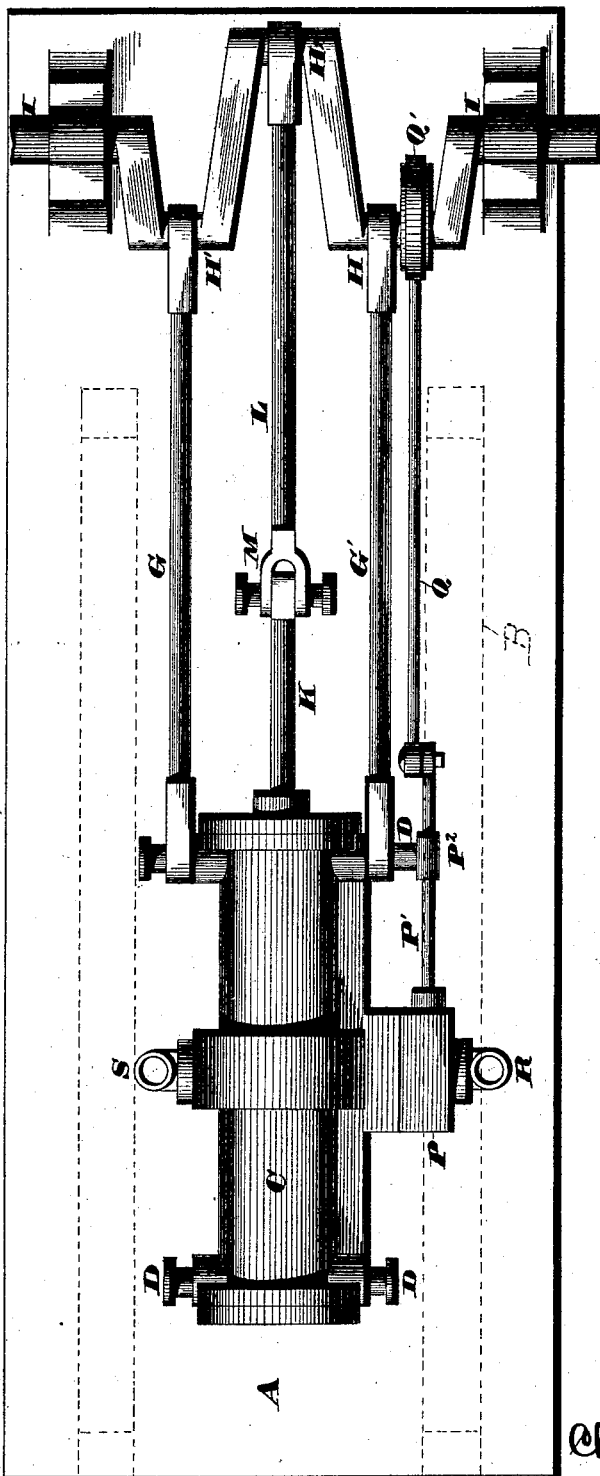
(No Model.)

2 Sheets—Sheet 1.

C. D. WOOLEY.  
STEAM ENGINE.

No. 266,946.

Patented Oct. 31, 1882.



WITNESSES  
*Geo. F. Downing.*  
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INVENTOR  
Chas D. Wooley,  
By R. H. Simpson,  
Attorney

(No Model.)

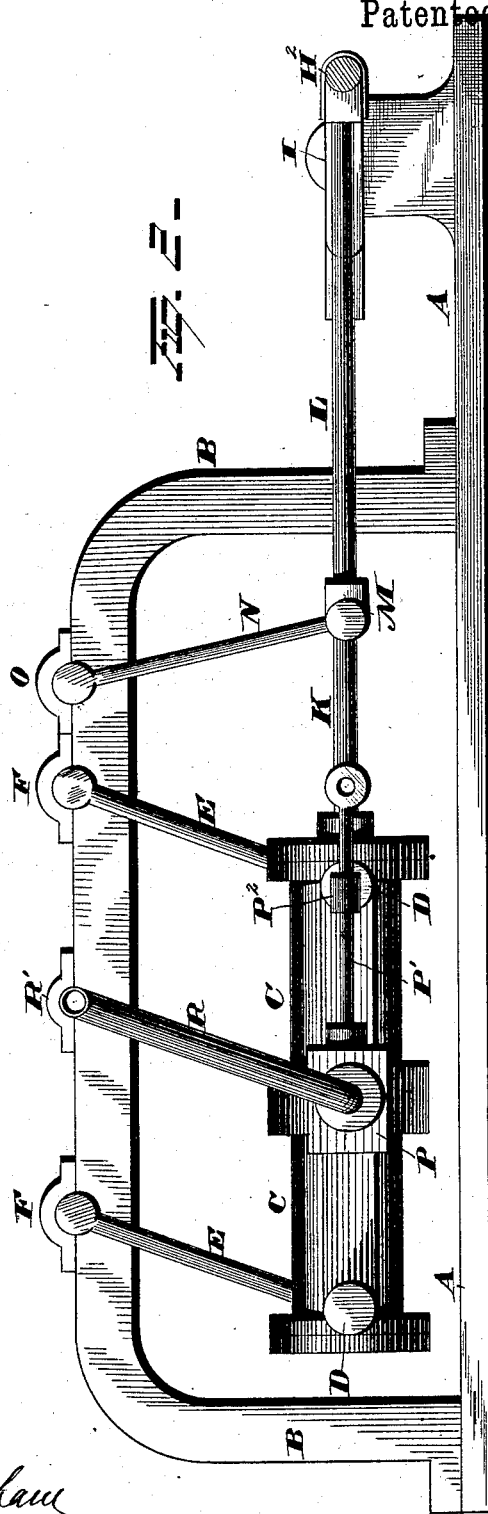
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WITNESSES  
*E. Nottingham*  
*Geo. F. Downing*

INVENTOR  
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Attorney

# UNITED STATES PATENT OFFICE.

CHARLES D. WOOLEY, OF WALDEN, NEW YORK.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 266,946, dated October 31, 1882.

Application filed September 21, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES D. WOOLEY, of Walden, in the county of Orange and State of New York, have invented certain new and useful Improvements in Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to an improvement in steam-engines, the object being to provide a steam-engine of such construction that as compared with engines of ordinary construction double the area of working-pressure from a given quantity of steam will be secured; further, to decrease the friction of the parts and to insure an even and steady movement of the crank-shaft. With these ends in view my invention consists in certain features of construction and arrangements of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of a steam-engine embodying my invention, the frame being shown in dotted lines. Fig. 2 is a view partly in side elevation and partly in vertical section.

A represents the bed-plate, and B the engine-frame, which parts may be of any approved construction and design.

C is the cylinder of the engine, and is constructed with four trunnions, D, situated at the ends of the cylinder, upon which are journaled the lower ends of suspension-links E, their upper ends being journaled in bearings F, situated on the frame B. This construction allows the cylinder to be swung back and forth as the engine is in operation.

G G' are connecting-rods, the rear ends of which are journaled on the forward trunnions, D, of the cylinder, and their outer ends on the end cranks, H H', of the crank-shaft I.

To the piston-rod K is attached the connecting-rod L by means of the cross-head M, which is supported by the swinging link N, the upper end of the link being supported in the bearing O at the top of the engine-frame. Connecting-rod L is attached to the middle crank, H<sup>2</sup>, the position of which is opposite the end cranks, H H', so that while the piston is making a stroke and turning the crank H in one

direction the end cranks, H H', will be revolved in the opposite direction through the medium of the cylinder and the connecting-rods G G'.

Upon the side of the cylinder is located the valve-chest P, from which extends the valve-rod P', it being supported in a bearing, P<sup>2</sup>. The outer end of the valve-rod is connected with an eccentric-rod, Q, the eccentric Q' being mounted on the crank H. Steam is admitted to the valve-chest through the steam-pipe R, which is connected to the valve-chest by a suitable swivel-joint and supported at its upper end in a bearing, R'. Exhaust-steam escapes through the exhaust-pipe S, which is constructed and arranged the same as the steam-pipe R.

Having described the construction and arrangement of parts, I will now briefly describe the operation of the engine.

Steam being admitted to the right of the piston serves to force the piston to the left and the steam-cylinder to the right, the head of the cylinder serving as a piston, and hence the power of the piston as it is moving to the left is transmitted to the center crank through the connecting-rod, and operates to turn the crank to the left; at the same time the cylinder is moving to the right and transmitting its power through its connecting-rods to the end cranks and turning them to the right. Thus it will be seen that the crank-shaft is subjected to equable strain, which operates to render the friction on its bearings to the minimum and insures to it an even and steady movement. The cross-head being supported to the swinging link which moves in the same circle as the cylinder is subjected to much less friction and wear than the ordinary cross-head moving in guides.

By the employment of my invention I obtain high piston speed, as the speed can be double that obtained in an engine of ordinary construction. Further, there is an absence of shock, as the strain is always being exerted on the crank-shaft in opposite directions, and the piston can be made so heavy as to nearly counterbalance the weight of the cylinder. Instead of suspending the cylinder by links, it may be supported on swinging standards, the parts being simply reversed; and hence I consider

such an arrangement of parts as within the scope of my invention.

I do not restrict myself to the particular construction and arrangement of parts shown and described, as it is evident that many slight changes both in the construction and the relative arrangement of the different parts might be resorted to without involving a departure from the spirit and scope of my invention.

10 Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a cylinder, of swinging links journaled at their free ends on trunnions located at opposite ends of the cylinder, the opposite ends of the links being journaled in fixed bearings, substantially as set forth.

2. The combination, with a cylinder suspended at opposite ends by swinging links, of

a crank-shaft, and connecting-rods for transmitting the motion of both the piston and cylinder to the crank-shaft, substantially as set forth.

3. The combination, with a cylinder supported at its opposite ends by swinging links, of an eccentric mounted on the crank of one of the connecting-rods, substantially as set forth.

4. In a steam-engine, the combination, with a swinging cylinder, connecting-rod, and cross-head, of a swinging link or rod for supporting the cross-head, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES D. WOOLEY.

Witnesses:

W. G. RUTHERFORD,

W. C. STEVENS.