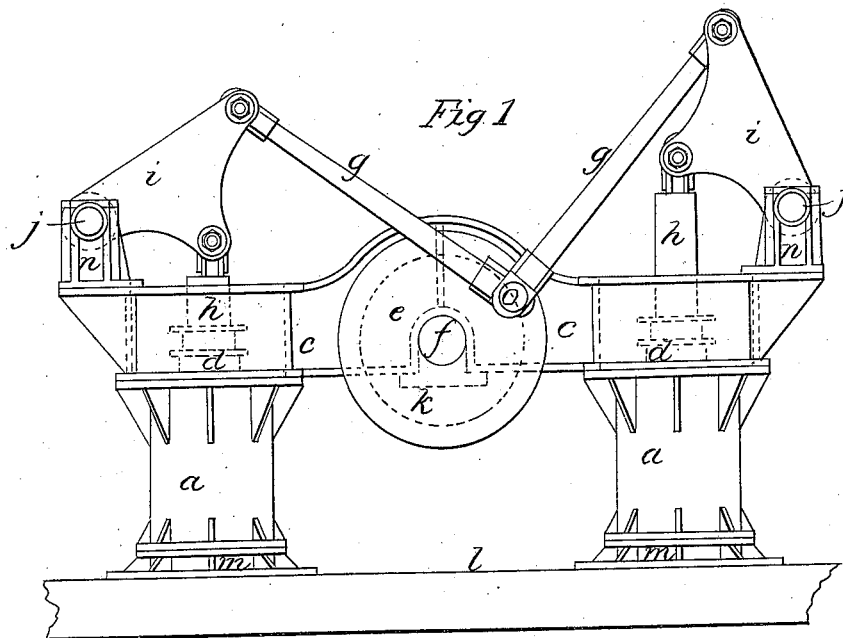
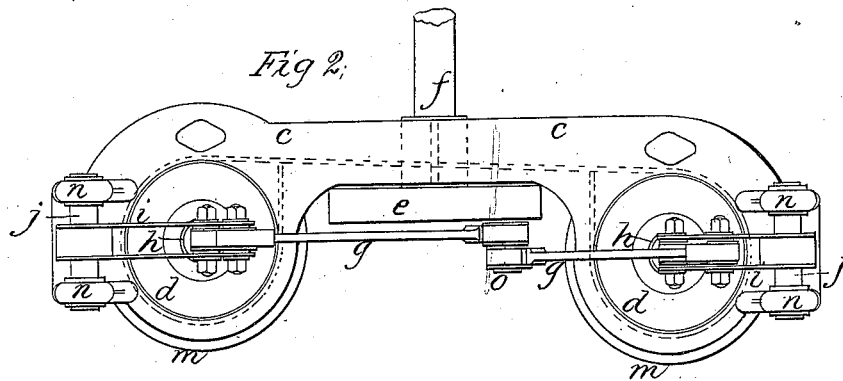


*N. W. Wheeler,*  
*Reciprocating Steam Engine,*  
*No 52,474,                      Patented Feb. 6, 1866.*



*Witnesses:*  
*John A. Cummings*  
*J. R. Rand.*

*Inventor*  
*Norman W. Wheeler*

# UNITED STATES PATENT OFFICE.

NORMAN W. WHEELER, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 52,474, dated February 6, 1866.

*To all whom it may concern:*

Be it known that I, NORMAN W. WHEELER, of the city of Brooklyn, E. D., county of Kings, and State of New York, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, and the letters of reference marked thereon, which letters indicate the same parts in the different views.

Figure 1 represents an elevation, and Fig. 2 a plan, of the invention.

The essence of my invention consists in combining two vertical, or nearly vertical, working-cylinders with an entablature resting upon the cylinders as upon columns, in such a way that the cylinders and entablature constitute the principal frame of the engine and give access to the upper cylinder-heads through apertures in the entablature, while both cylinders act upon the same crank, and all parts are easily accessible for adjustment and for repairs.

In the drawings, *a a* are the cylinders; *c c*, the entablature; *d d*, the upper cylinder-heads, which pass down through openings in the entablature; *E*, the crank-wheel; *f*, the main shaft; *g g*, the connecting-rods; *h h*, trunks connected with the pistons, and connected with links within them to the beams *i i*.

*j j* are the beam-shafts, resting and vibrating in the bearings *n n n n*, and *m m* are the lower cylinder-heads, which also serve as bases for the cylinders, considered as columns, and are secured to the foundation or keelson *l*.

The method of applying the ordinary valve-gear, the rock-shafts having their bearings upon the entablature, is so obvious that the details have been omitted in the drawings.

It will be observed that the pins for the connecting-rods *g g* are farther from the center shafts, *j j*, upon which the beams *i i* vibrate, than are the pins to which the trunk-links connect, and hence the crank has a proportionably greater throw than the stroke of the pistons. By this means the connecting-rods *j j* are made to work clear of the upper flange of the entablature *c c*, which needs considerable depth to secure the requisite strength, and the

incidental advantage of a diminution of pressure and friction upon the crank-pin and main journal is attained beyond what would ensue if the crank-throw were equal to the piston-stroke.

In the example before us the entablature consists principally of top and bottom flanges connected by a web, which runs across from one cylinder to the other and around the circumference of the upper cylinder-heads, *d d*, in such a way that the lower flange may be bolted to the wide flanges upon the upper ends of the cylinders, and the cylinder-heads *d d* be passed down through the entablature, and bolted also to the upper cylinder-flanges within the entablature, making altogether a very strong frame, with an accessible and firm bearing, *K*, for the main shaft *f* upon the under side of the entablature, between the cylinders. The frame may be further strengthened by carrying the entablature across from one cylinder to the other in two parts, with the crank-wheel between them; but for engines of moderate size it is not necessary. The cylinders may be placed opposite each other, instead of past each other, as here shown; but that would render necessary a forked connecting-rod or an analogous device.

An inspection of the drawings will render plain the action of the engine, and also show that by this construction a degree of flexibility and strength, together with lightness, as well as accessibility, is attained which renders this in the above important points the equivalent for screw-engines of the ordinary beam-engine so generally used to actuate paddle-wheels.

When these engines are to be located within a contracted space it may be desirable and proper to place a condenser between the cylinders, under the crank-wheel, and perhaps bolt it to the cylinders, in which case the condenser might be considered a part of the frame; but it cannot be a principal part, even though it sustain the weight of the whole structure, for the reason that the condenser would afford no adequate support for the bearings *n n n n*, or their equivalents, nor be in a good position to resist the strains generated in working the engine.

There are many ways in which the motion

of the pistons may be communicated to the crank besides the one here shown, and I do not limit myself to it.

Having described my invention, I will proceed to state what I claim and desire to secure by Letters Patent, viz:

The combination of two vertical, or nearly vertical, working-cylinders, *a a*, with a connecting-entablature, *c c*, in such manner that the cylin-

ders and entablature will constitute the principal frame of the engine, when so arranged that the upper cylinder-heads, *d d*, will pass into their places through the entablature, substantially as and for the purposes described.

NORMAN W. WHEELER.

Witnesses:

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S. R. RAND.