

Shellenback & Harton.

Reciprocating Steam Engine.

N^o 99,602.

Patented Feb. 8, 1870.

Fig. 1.

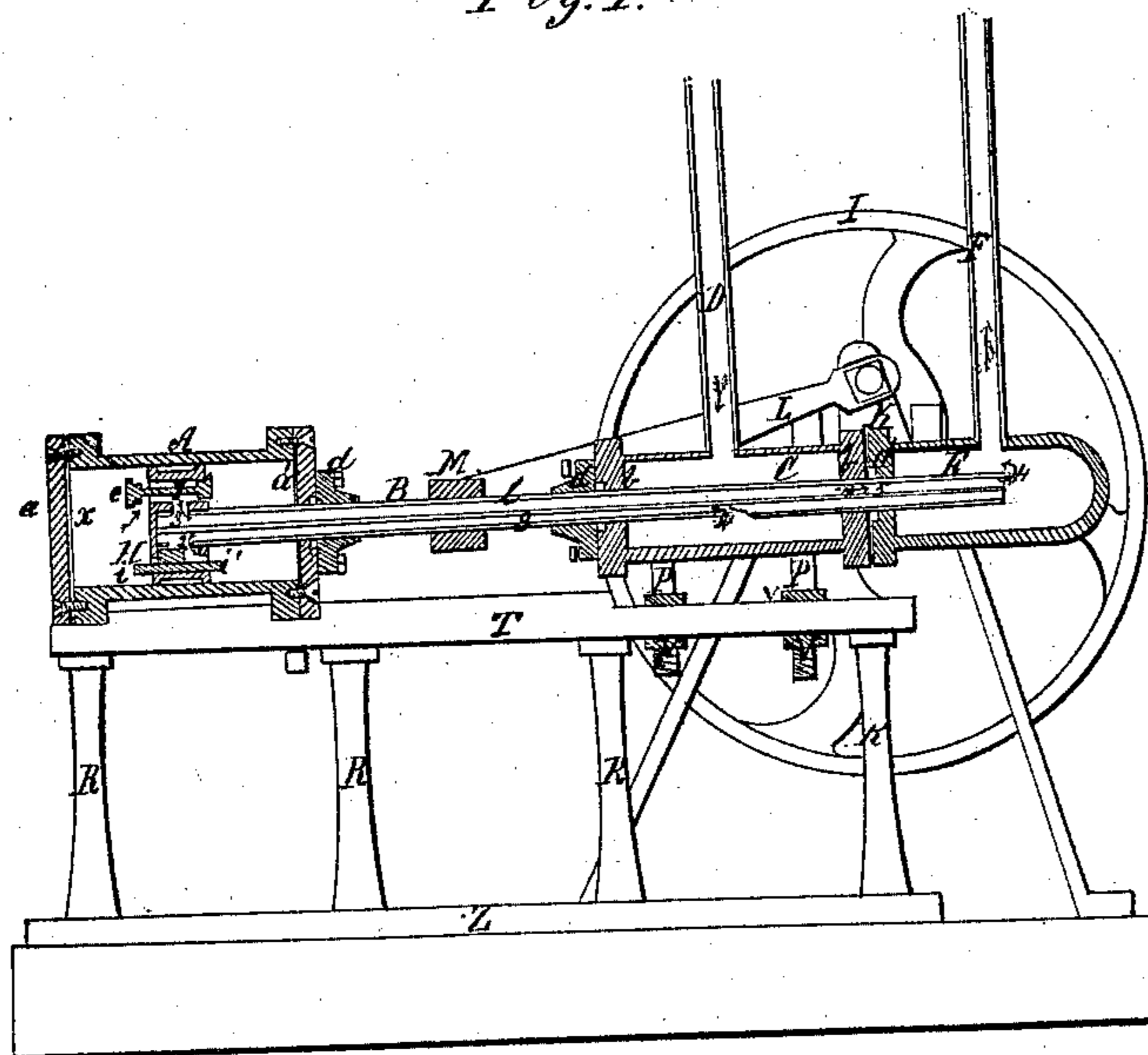


Fig. 2.

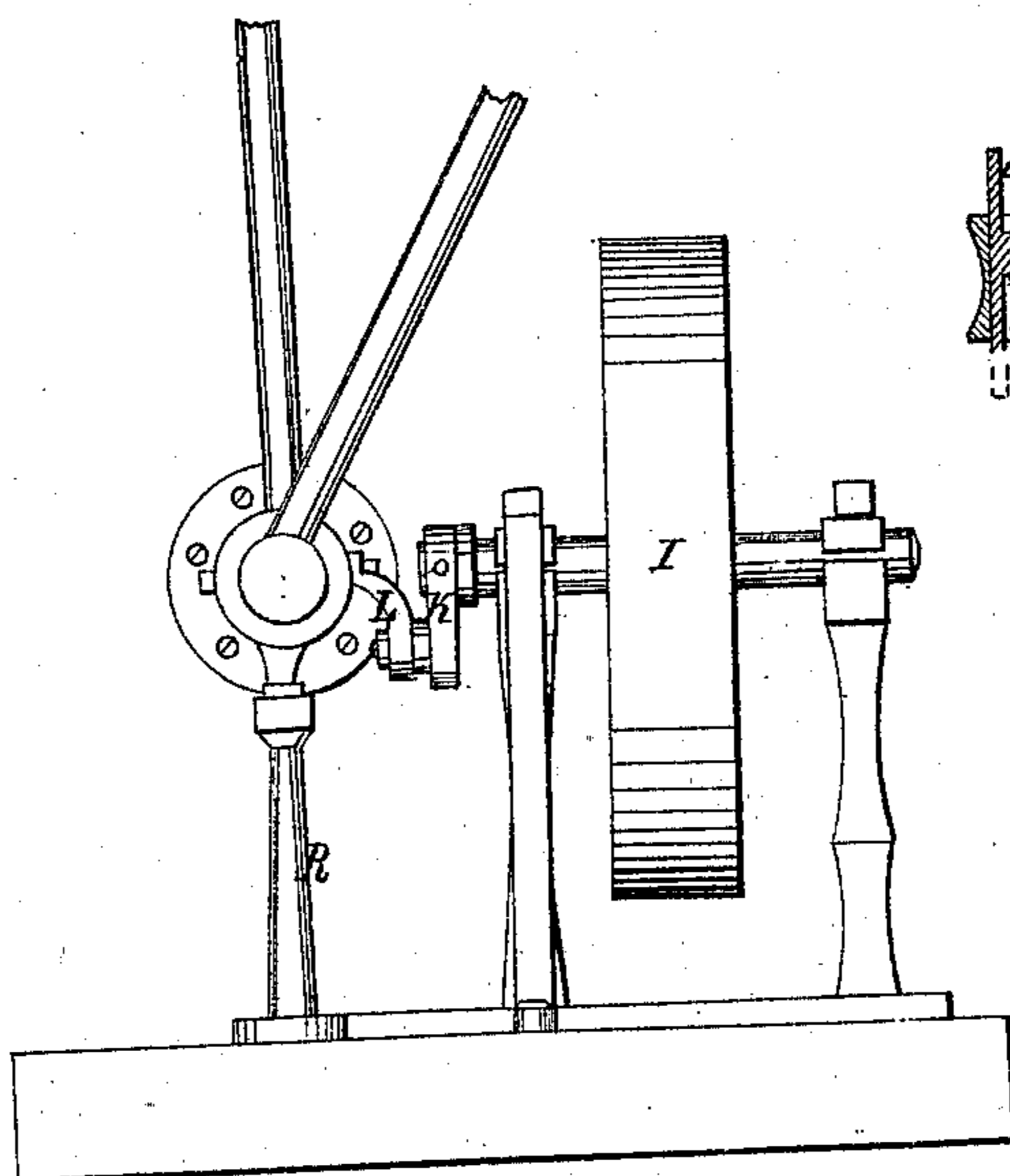
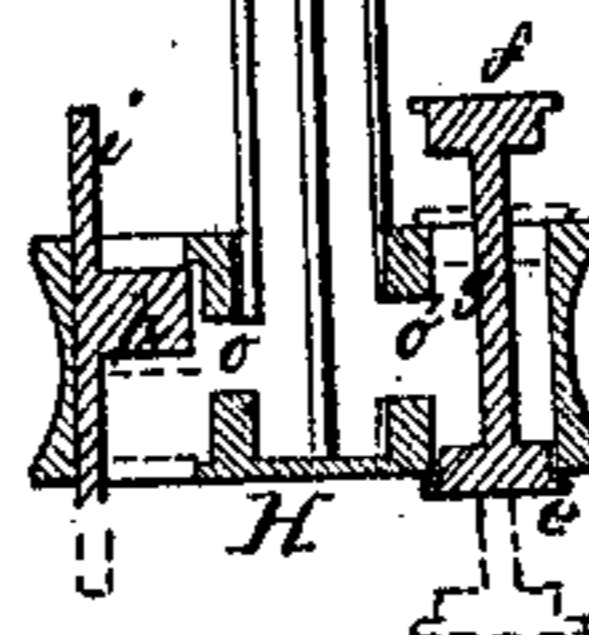


Fig. 8



Witnesses

C. S. Peck
S. C. Peck

Inventors.

Peter Schellenback
John Harton

by their atty.
H. R. Peck

UNITED STATES PATENT OFFICE.

PETER SHELLENBACK, OF MIDDLETOWN, OHIO, AND JOHN HARTON, OF SEYMOUR, INDIANA.

STEAM-ENGINE.

Specification forming part of Letters Patent No. 99,602, dated February 8, 1870.

To all whom it may concern:

Be it known that we, PETER SHELLENBACK, of Middletown, in Butler county, Ohio, and JOHN HARTON, of Seymour, in the county of Jackson, Indiana, have invented new and useful Improvements in Steam-Engines; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 represents a longitudinal vertical section of our improved steam-engine. Fig. 2 represents an end view of the same, together with the pulley, axle, crank, and pitman. Fig. 3 represents a central longitudinal section of the piston-rod and head with valves, &c.

The object of our invention is to cheapen and simplify the reciprocating steam-engine, and to reduce the friction of its mechanism and more effectually utilize the steam; and our invention consists in the combination of a tubular piston-rod with a steam-chest and working steam-cylinder provided with valves, induction and eduction orifices, and coupling mechanism, as herein fully set forth.

In the accompanying drawings, A denotes the working-cylinder, having heads *a a'*, closed, excepting the orifice through which the piston-rod B works.

C is the steam-chest, provided with the steam-induction pipe D, and both of its heads *b b* are provided with orifices for the piston-rod B. The heads *b b* and *a'* are provided with stuffing-boxes *d d d* around the piston-rod B, constructed in the usual manner.

E denotes the steam-exhaust chamber, with which the exhaust-pipe F is connected. The piston-rod is provided with two longitudinal orifices for the induction of steam to the working-cylinder A and the eduction thereof to the steam-exhaust chamber E. The induction tube or orifice *s* extends from the aperture at the arrow 1 to the aperture at arrow 2, and the eduction orifice or tube extends from the arrow 3 within the cylinder A to the arrow 4 at the end of the piston-rod B.

The piston-head H has two apertures extending through it parallel with the rod B, in which the valves *e f* (connected by rod *g*) and valve *h* (provided with arms *i i*) are located,

as represented in sectional Figs. 1 and 3. Both of the apertures in which the valves *h e f* work communicate with the tubes of the piston-rod, as seen in Fig. 3 at *o o'*. The port or aperture *o* communicates with the induction-tube, and the port *o'* communicates with the eduction-tube, within the piston-rod B.

The balance-wheel and pulley I is hung upon axle J, and the latter is provided with the crank-arm K, and the pitman L extends from the crank-arm K to the collar M, and it is fastened in the usual manner by means of wrist-pin to the collar M. The collar is secured upon the piston-rod by means of a set-screw. The branched pitman may be used, having two connections with collar M; and the collar may be constructed in two parts, and be secured upon the piston-rod by means of shoulders or grooves formed around the rod B.

To retain the steam-chest C and exhaust-chamber E in line with and true relation to the cylinder A and piston-rod B, the two former are supported upon the adjusting-studs P P, which are provided with screw-threads and nuts V V.

The structure is elevated upon a suitable stand, R T Z.

To use our steam-engine the steam will be admitted through the pipe D into the steam-chest C, surrounding the piston-rod B. Thence it passes through tube *s*, out through port *o*, thence into the rear portion of the cylinder A, behind the piston-head. The action of the steam thus introduced into the cylinder will force the piston-head H, with the rod B, against the cylinder-head at *x*, which movement will cause the valves *e, f*, and *h* to be reversed in position, which will admit the steam through tube *s* into the cylinder A in front of the piston-head H, and the exhaust-steam will escape from the rear portion of the cylinder at the open valve *f*, thence through port 3, through the tube *t*, to the exhaust-chamber E, as indicated by arrow 5, and at the same time the valve *h* will be in position to prevent the induction-steam from entering into the rear portion of cylinder A. By the reversed movement of the piston-head H the valves *e, f*, and *h* are again acted upon by the arm *i'* and valve *f*, being brought in contact with the cylinder-head *a'*, which will open the port 3 for the

emission of the exhaust-steam in the front portion of the cylinder A, and at the same time will again open the port 2 to communicate with the rear portion of cylinder A, the valve *h* simultaneously closing the communication between the induction-tube *s* and the portion of the cylinder in front of the piston-head. This reciprocating movement is kept up until the steam is shut off from the engine. The pitman being connected with the piston-rod in the manner described, it will be readily understood how the power may be applied. The action of the valves is direct, and they consequently work with the least friction and wear.

Our invention dispenses with external ports and valve-seats upon the working-cylinder, and it does not require the cross-head and slides with which to connect the pitman and piston-rod; nor does it require any eccentric, rock-arm, and their supporting mechanism. A less degree of pressure is required to actuate our improved engine to effect a given power than is required by those of ordinary construction, because the pressure is continuously equal throughout the entire stroke of the engine, and there is no consumption of steam in actuating the valves.

Having practically tested our invention, its excellence and efficiency have been established. It should be further observed that the steam-

chest C serves to perform the functions of the guide-rails or slides and cross-head of the engines in present use.

Having fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The piston-rod B, provided with a double channel—one for the live steam and the other for the exhaust—substantially as and for the purpose specified.

2. The cylinder A, in combination with the piston-rod and its head H, constructed and operating substantially as and for the purpose described.

3. The tubular piston-rod B and head H, in combination with the valves *e f h*, operating in the manner and for the purpose described.

4. The collar M, in combination with the piston B, cylinder A, and steam-chest C, substantially as and for the purpose described.

5. The exhaust-chamber E, in combination with the tubular piston-rod B, arranged and operating in the manner and for the purpose specified.

In testimony whereof we have subscribed our names this 22d day of May, 1869.

PETER SHELLBACK.
JNO. HARTON.

Witnesses:

H. P. K. PECK,
E. S. BERRY.