

(No Model.)

2 Sheets—Sheet 1.

P. HARTRAMPF.
ENGINE CONNECTION.

No. 443,046.

Patented Dec. 16, 1890.

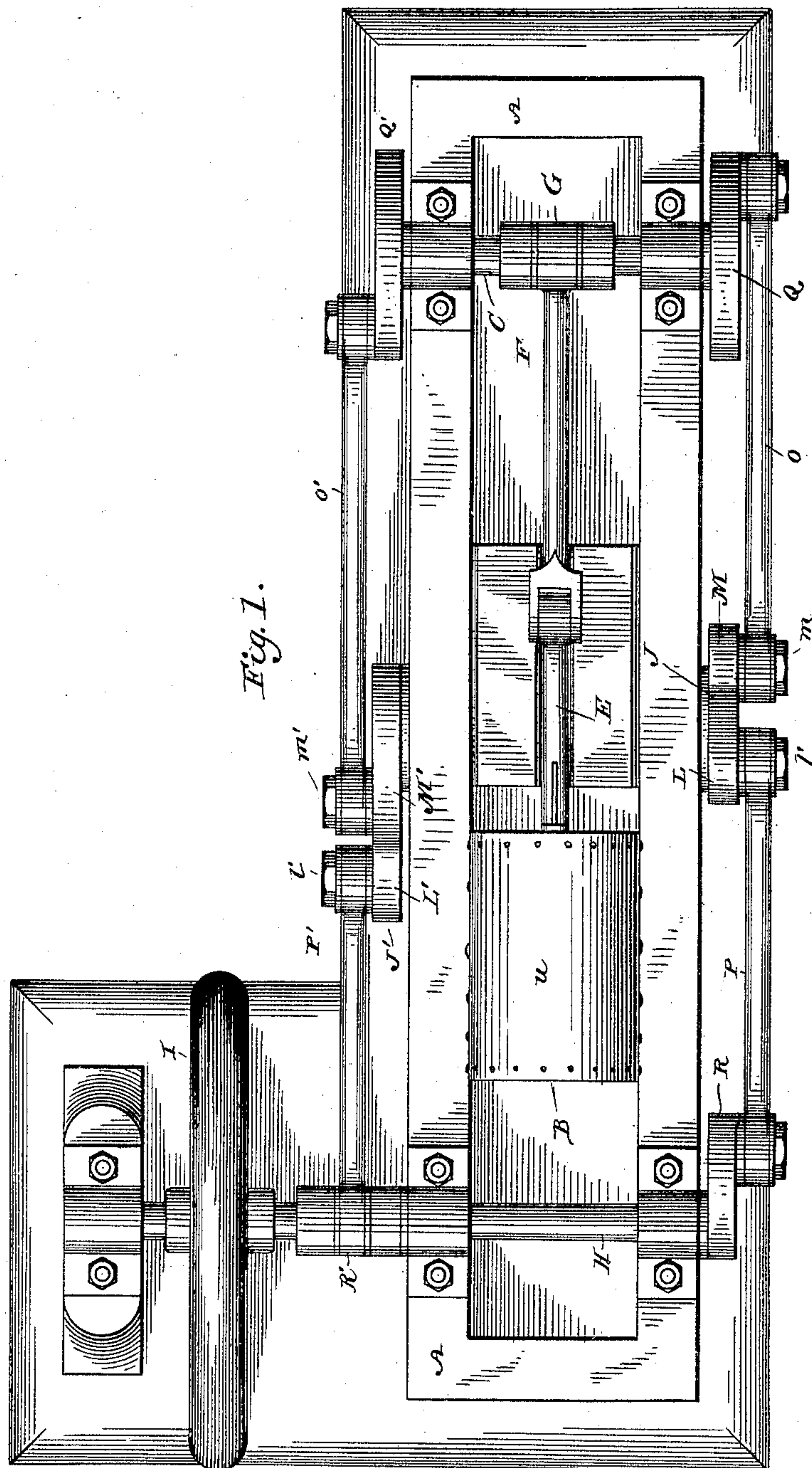


Fig. 1.

Witnesses

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Inventor
Paul Hartrampf.

By his Attorneys

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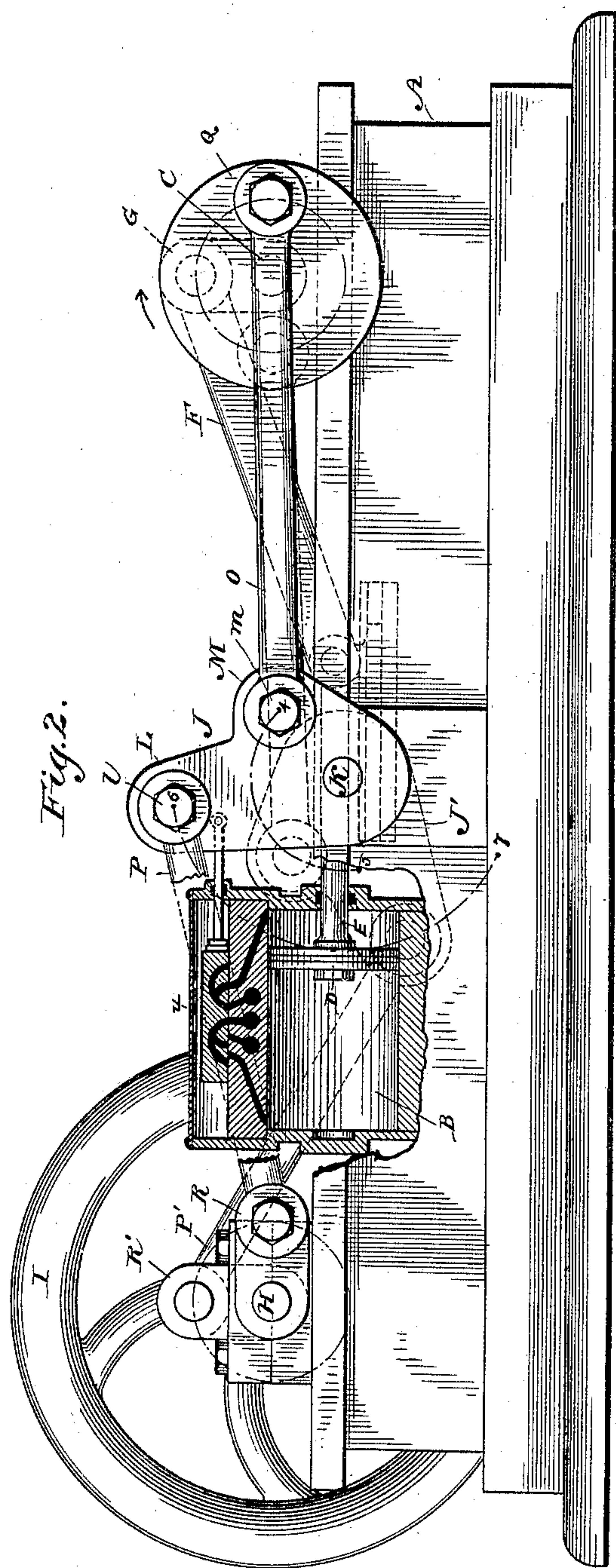
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UNITED STATES PATENT OFFICE.

PAUL HARTRAMPF, OF BIRMINGHAM, ALABAMA.

ENGINE CONNECTION.

SPECIFICATION forming part of Letters Patent No. 443,046, dated December 16, 1890.

Application filed December 24, 1889. Serial No. 334,812. (No model.)

To all whom it may concern:

Be it known that I, PAUL HARTRAMPF, a citizen of the United States, residing at Birmingham, Jefferson county, State of Alabama, have invented certain new and useful Improvements in Engine Connections, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to an engine having a main shaft connected with a secondary shaft through the intermediary of peculiar cranks and levers in such manner as to transmit the power of the main to the secondary shaft at increased speed, all as hereinafter more fully described, and then pointed out in the claims.

The chief objects of my invention are to multiply the speed obtained from an engine without increasing the speed of the piston.

In the accompanying drawings of an engine made after the manner of my invention, and in which like letters of reference designate like parts throughout, Figure 1 is a top plan view, and Fig. 2 is a side elevation thereof with the cylinder and valve-plate and valve in central vertical section, and with part of the connecting-levers and engine-frame broken away.

As the mechanism for transmitting the motion of the main shaft to the secondary shaft is duplicated, it will only be necessary to describe one set of such duplicated parts, and in order to distinguish one set from the other I will mark the reference-letters of one set with primes.

Referring to the drawings, A designates the engine-frame, having a bed-plate, and B is a cylinder mounted horizontally in the frame to one side of the center of length thereof. At the other end of the frame is the main or crank shaft C, set in suitable bearings and driven by the piston D through the usual intermediary of piston-rod E, connecting-rod F, and crank G, the cross-head of the piston-rod being mounted in the ordinary guideways.

At the end of the frame remote from the main shaft C is mounted the secondary or

speed shaft H, parallel with the main shaft and provided with a fly-wheel I. The main or crank shaft C is connected to and drives at increased speed the shaft H through means of the following duplicate parts: A rocker-crank J is mounted at the side of the frame upon a stud K, so as to vibrate in the vertical plane. The arms L and M of this crank are shown as forming an acute angle with each other, and the former is of greater length than the latter; or, in other words, the distance from the points K to *l* is greater than K to *m*, the points *l* and *m* being respectively the attaching-points of the connecting-levers O and P, which are connected by their other ends to the main shaft C and secondary shaft H by crank-disk Q and crank R, respectively. These parts just described are preferably located to the outside of the engine-frame, though of course any desired disposition may be made of them; but the arrangement shown secures the greatest economy in length of space occupied by the engine. The ratio of the lengths of the crank-arms L and M is represented as two to one, and with this construction I obviously obtain two revolutions of the secondary shaft H for one of the main shaft C. The cranks J J' are pivoted, preferably, below the center line of the engine, so as to allow of the proper proportioning of the connecting-levers.

From the foregoing description it will be understood that at each stroke of the piston the main shaft C performs one revolution, the connecting-lever O rocks the crank on its axis, so as to move the arm M to and fro over the arc 4 5 and the long arm L to and fro over the arc 6 and 7, thereby producing two revolutions of the secondary shaft H, since at each one-way movements of arm L over its arc such shaft is given one revolution.

In the arrangement of the duplicate parts Q Q', O O', J J', P P', and R R', they are so placed that one set has a lead on the other to overcome dead-centers. The lead here shown is about a half-center, making a quarter-center lead when considered in reference to the crank G, as will be readily understood from the drawings, wherein the crank G is a quarter of a circle in lead of the crank Q' and the crank Q is the same distance in advance of

the main crank G. The same relation in the lead of the cranks is observed for both the main and secondary shafts. The lead these parts are set at is a matter of adjustment and
5 is of course necessary to successfully overcome dead-centers, and, moreover, to prevent reversal and consequent rupture of the mechanism after the steam is shut off and the engine runs idly under its momentum.

10 There are many applications that may be made of my novel speed-multiplying mechanism. It may also readily be used to reduce speed, especially in connection with electric
15 shaft could be used as the armature-shaft and the main shaft C as the drive-shaft, thereby reducing the speed one-half.

Having thus described my improvements in engines, what I claim as my invention, and
20 desire to secure by Letters Patent, is—

1. An engine having in combination a main or crank shaft and a secondary or speed shaft; a set of cranks having arms of different lengths—for instance, one arm double the
25 length of the other—levers connecting the main shaft with the short arms of the cranks, respectively, and levers connecting the secondary shaft with the long arms of the cranks, respectively, whereby the speed of the sec-
30 ondary shaft may be increased over that of the main shaft through means of such cranks and levers, substantially as and for the purpose set forth.

35 2. An engine having in combination a main or crank shaft suitably driven by a con-

necting-rod connected thereto by a crank, a crank on such main shaft at each side of the said first crank, a secondary or speed shaft, rocker-cranks located intermediate the said main and speed shafts and having one arm
40 thereof double the length of the other, connecting-levers intermediate the said cranks at each side of the main crank and the short arms of the rocker-cranks, and connecting-levers intermediate the secondary shaft and
45 the long arms of the rocker-cranks, whereby the main shaft may drive the secondary shaft at double its speed.

3. An engine having a suitably-driven crank-shaft C and a secondary or speed shaft
50 H, the vibrating rocker-cranks J J', the connecting-levers O O', connected by one end by suitable cranks to the shaft C and by the other end to the said rocker-cranks J J', re-
55 spectively, and the connecting-levers P P', connected intermediate the said shaft H and the said rocker-cranks J J', the points of attachment of said levers P P' to the said cranks J J' being a greater distance from the
60 center of motion of the same than the points of attachment of the said levers O O', substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand and seal, this 11th day of December, 1889, in the presence of the two subscribing
65 witnesses.

PAUL HARTRAMPF. [L. S.]

Witnesses:

EDWARD BRAUNINGER,
WILLIS FOWLER.