

No. 765,099.

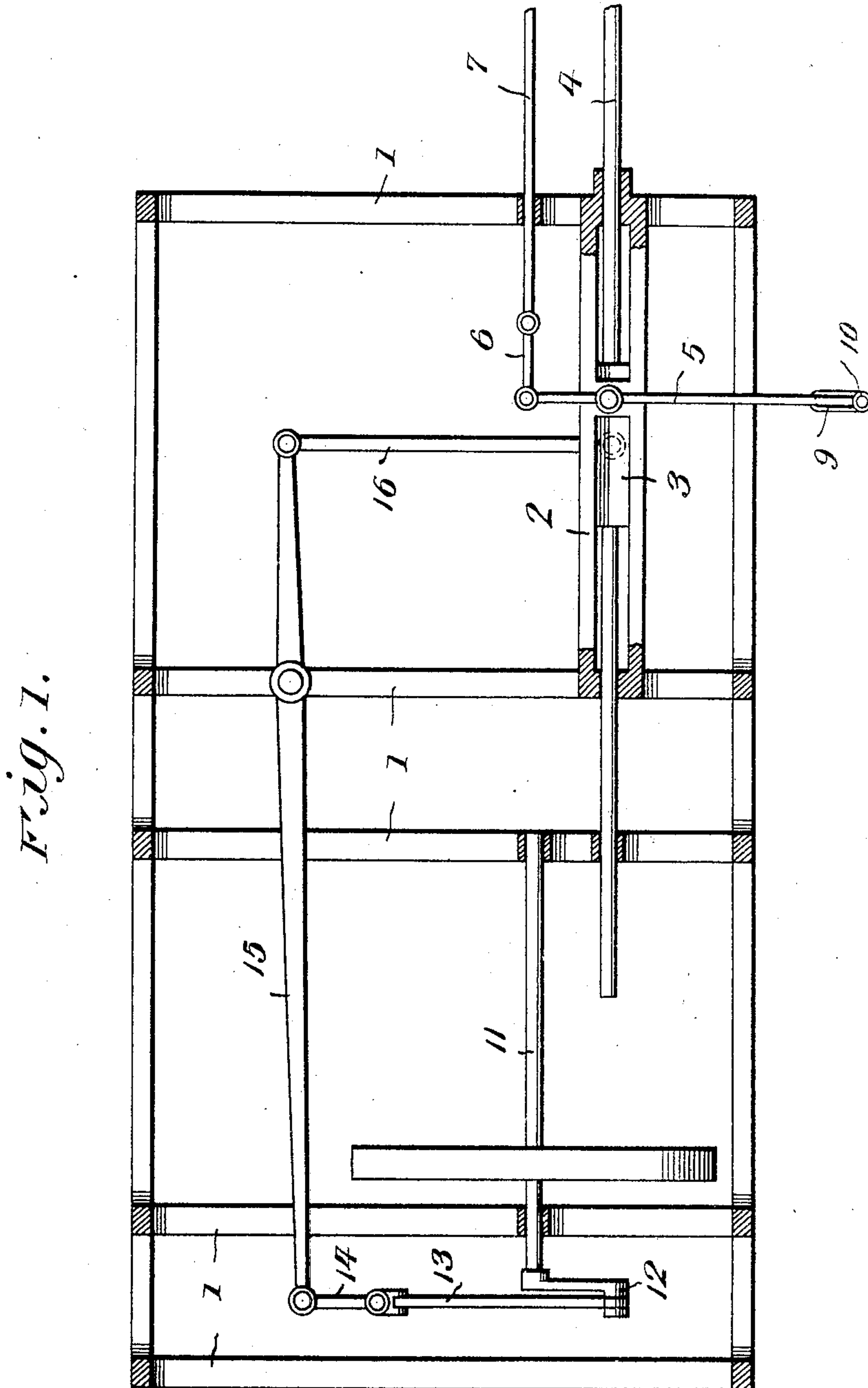
PATENTED JULY 12, 1904.

O. L. RICHARDS.  
DOUBLE SPEED ENGINE.

APPLICATION FILED JAN. 27, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:

J. W. Peck.  
Herbert D. Lawson

INVENTOR  
*Oliver L. Richards.*

By  
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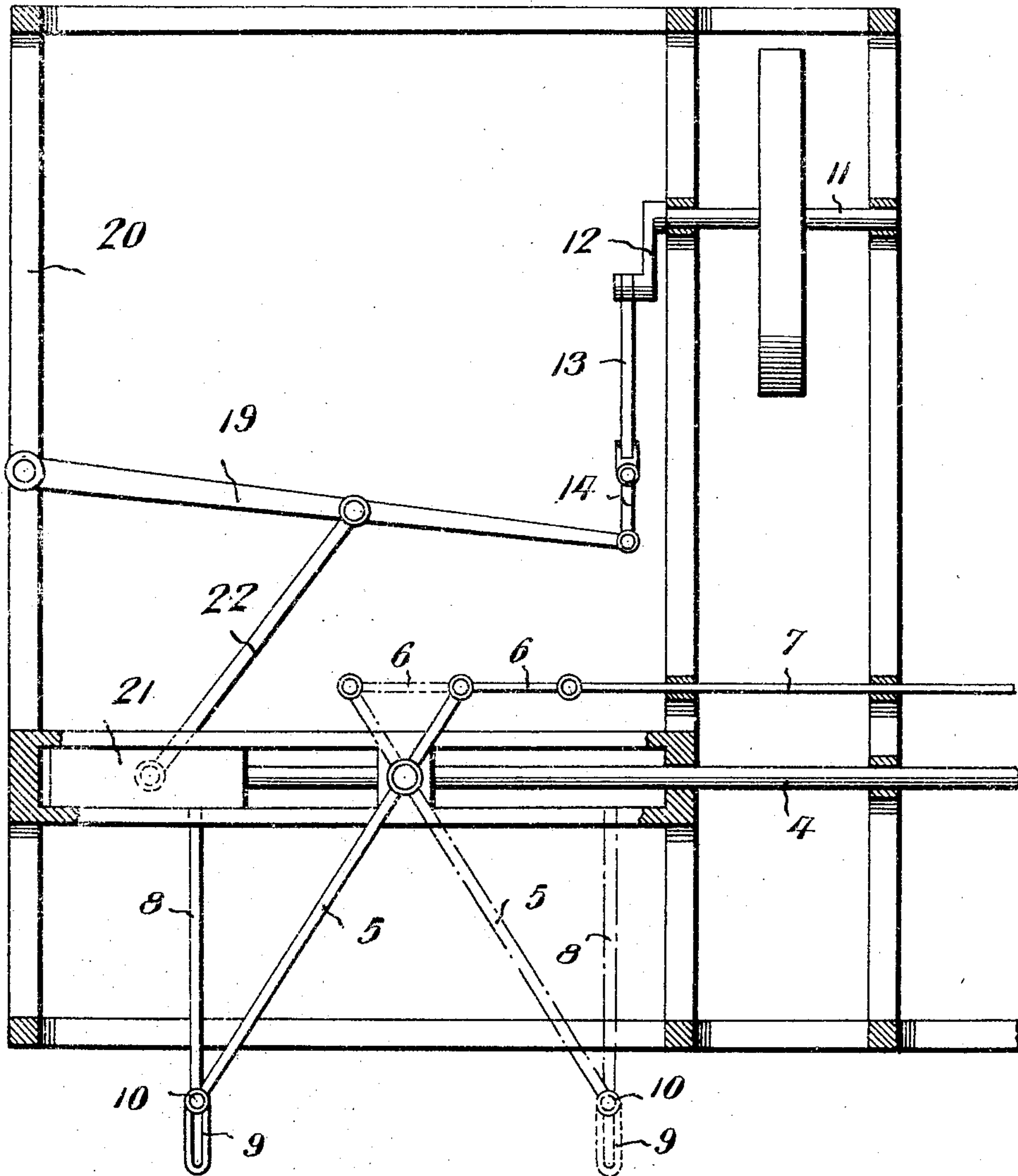
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3 SHEETS—SHEET 3.

*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

OLIVER L. RICHARDS, OF CUSHING, TEXAS.

## DOUBLE-SPEED ENGINE.

SPECIFICATION forming part of Letters Patent No. 765,099, dated July 12, 1904.

Application filed January 27, 1904. Serial No. 190,798. (No model.)

*To all whom it may concern:*

Be it known that I, OLIVER L. RICHARDS, a citizen of the United States, residing at Cushing, in the county of Nacogdoches and State of Texas, have invented new and useful Improvements in Double-Speed Engines, of which the following is a specification.

My invention relates to new and useful improvements in power-transmitting attachments for engines; and its object is to provide mechanism whereby one revolution of a shaft may be produced by each stroke of the piston of an engine.

The invention consists of a novel arrangement of levers which are connected to the rod of the engine-piston and to the shaft to be rotated, and these levers are so arranged as to produce one revolution of a shaft during each stroke of the piston.

The invention also consists in the further novel construction and combination of parts hereinafter more fully described and claimed, and illustrated in the accompanying drawings, showing the preferred form of my invention, and in which—

Figure 1 is an elevation of my improved attachment, the frame therefor being shown partly in sections. Fig. 2 is a similar view, showing by solid and dotted lines the positions of the parts at the ends of two strokes of the piston-rod; and Fig. 3 is an elevation of a modified form of attachment.

Referring to the figures by numerals of reference, 1 1 are standards which serve to support guide-rails 2, having a cross-head 3 slidably mounted therein. This cross-head is secured to a piston-rod 4, extending from an engine-piston, (not shown,) and pivoted on the guide-strips 2 is a lever 5, one end of which is connected, by means of a link 6, with a valve-rod 7. Arm 8 extends from the cross-head 3 and has a longitudinally-extending slot 9 therein, which receives a stud 10, projecting laterally from lever 5.

A shaft 11 is journaled upon two of the standards 1 and is provided with a crank 12, which is connected, by means of links 13 and 14, with one end of a lever 15, fulcrumed at a point between its ends on one of the stand-

ards. The other end of this lever is connected, by means of a rod 16, with the cross-head 3. A guide-rod 17 extends longitudinally from the cross-head and through a bearing 18, connected to one of the standards and this rod serves to remove lateral strain from the cross-head and to assist the piston-rod 4 in holding the cross-head on the guide-strips 2.

It will be seen that when one-half of the stroke of rod 4 in either direction has occurred the parts will assume the positions shown in Fig. 1. When the cross-head 3 is continued forward in its movement with the rod 4, lever 15 will be swung upon its fulcrum and draw the crank 12 in the position shown in Fig. 2. During the return movement of the cross-head the lever 15 will be again swung upon its fulcrum so as to produce one-half a revolution of crank 12, and as the cross-head continues to travel backward the revolution of the crank will be completed. It will thus be seen that during each movement of the cross-head 3 the crank 12 is rotated once, and the speed of an ordinary engine can thus be doubled.

In Fig. 3 I have shown a modified form of apparatus in which the lever 19 is fulcrumed at one end to one of the standards 20 and is connected to the cross-head 21 by a rod 22, pivoted to the lever at a point between its ends. In other respects the device is substantially similar to that hereinbefore described. In both forms of attachment the lever 5 is provided for operating the valve of the engine at proper intervals—to wit, at the completion of each stroke of the piston.

In the foregoing description I have shown the preferred form of my invention; but I do not limit myself thereto, as I am aware that modifications may be made therein without departing from the spirit or sacrificing any of the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of my invention.

Having thus described the invention, what is claimed as new is—

A power attachment for reciprocating engines comprising a frame, guide-rails therein, a reciprocating cross-head adapted to be

connected to the piston of an engine, a crank-shaft journaled within the frame, a lever fulcrumed upon the frame, links connecting one end of the lever with the crank-shaft, and a  
5 rod pivoted at opposite ends to the lever and cross-head, the pivotal connection between said rod and lever being located at a point opposite the center of the stroke of the cross-head, whereby two movements of the lever

may be produced during each stroke of the cross-head.

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

OLIVER L. RICHARDS.

Witnesses:

G. W. COWIN,

W. F. DANIEL.