

(No Model.)

4 Sheets—Sheet 1.

H. F. GASKILL.  
DUPLEX ENGINE.

No. 411,497.

Patented Sept. 24, 1889.

Fig. 1.

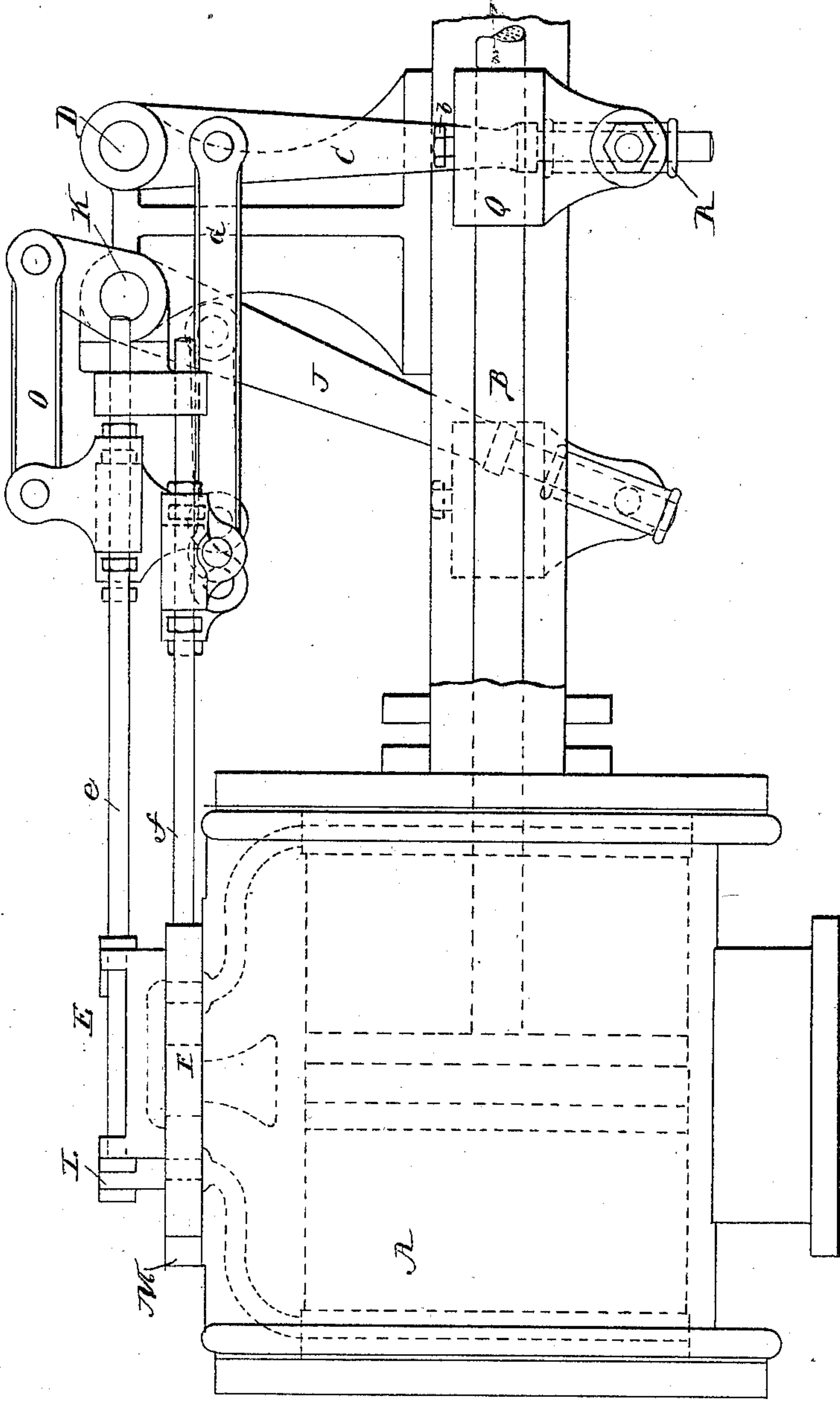
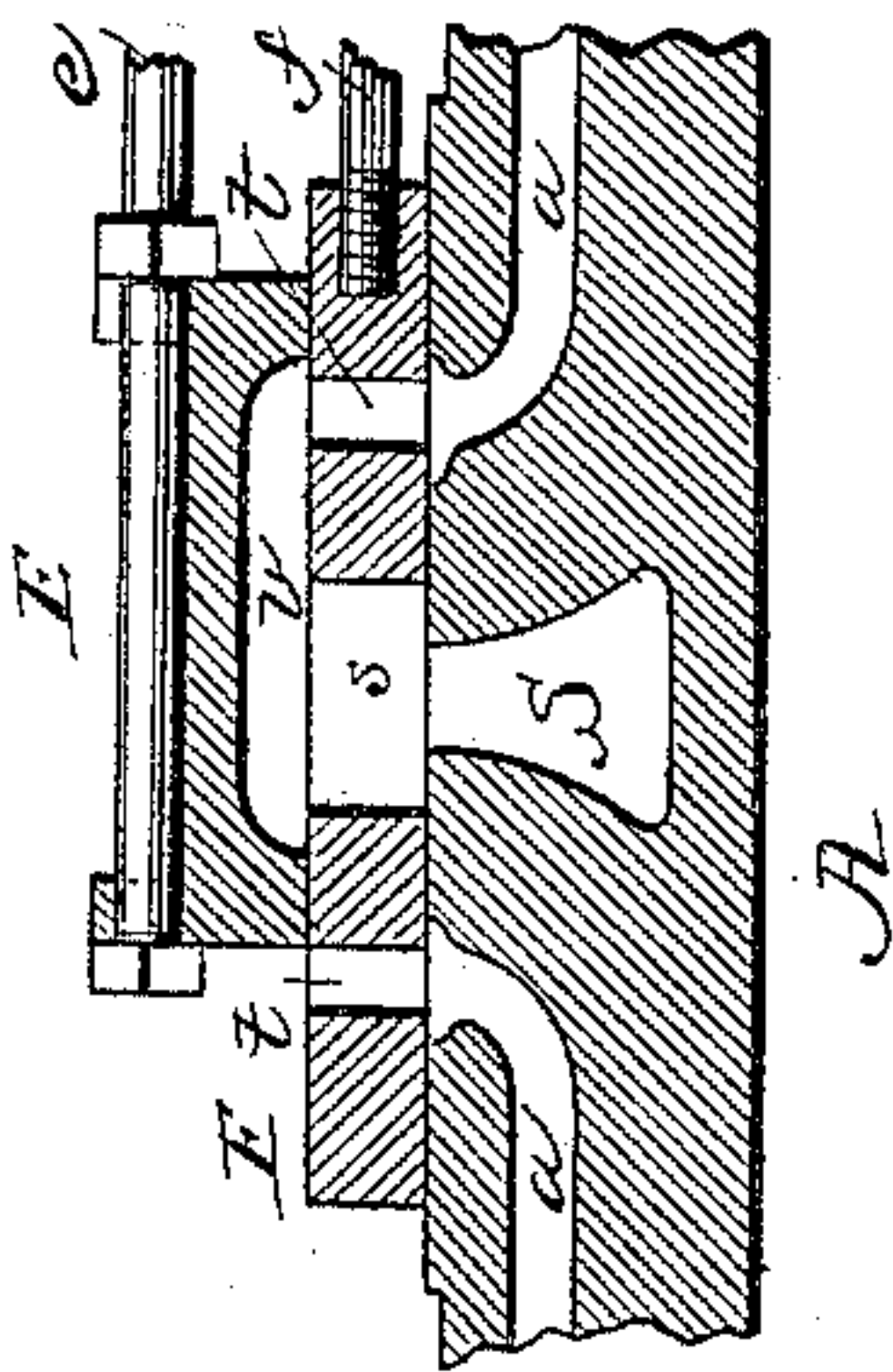


Fig. 5.



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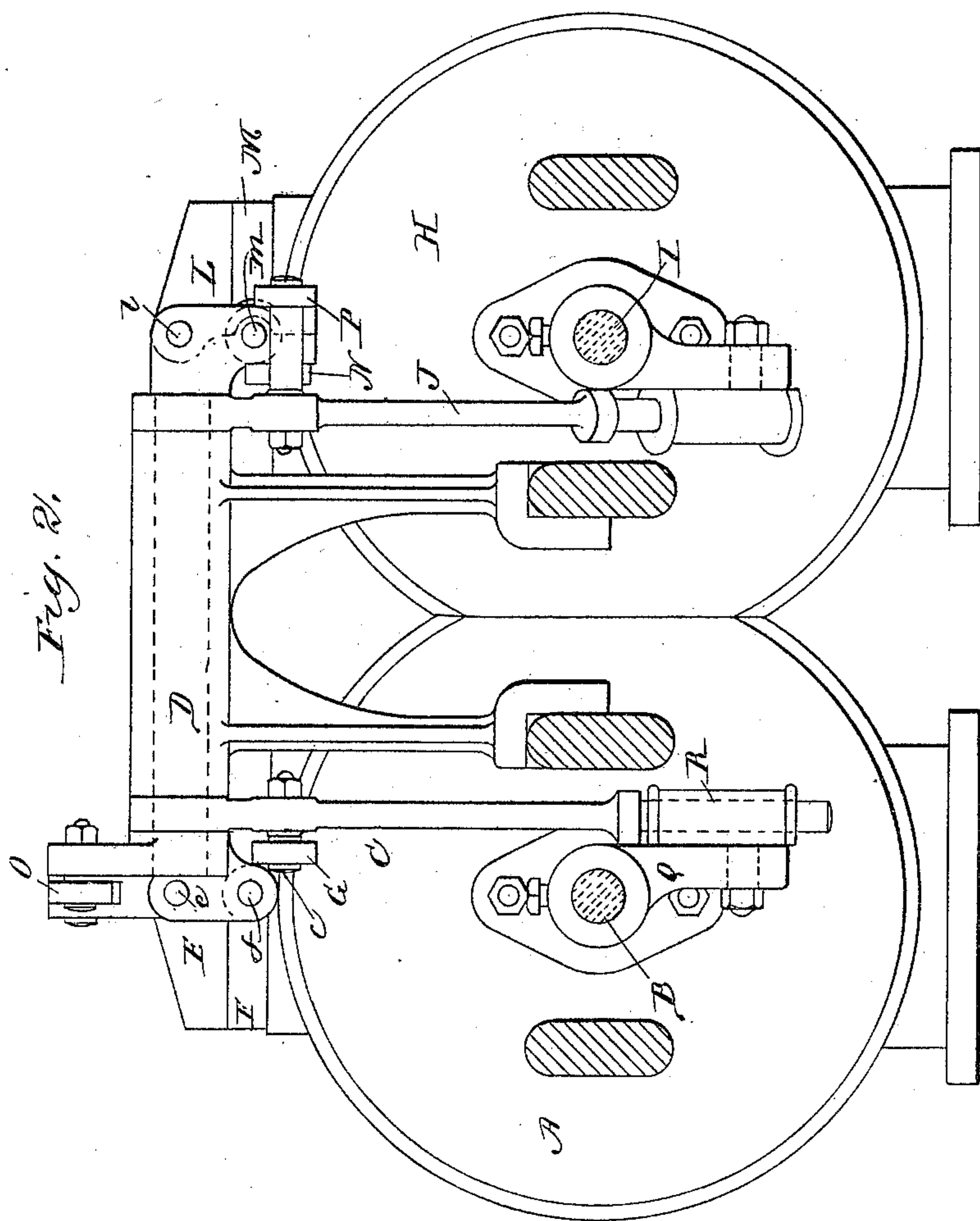
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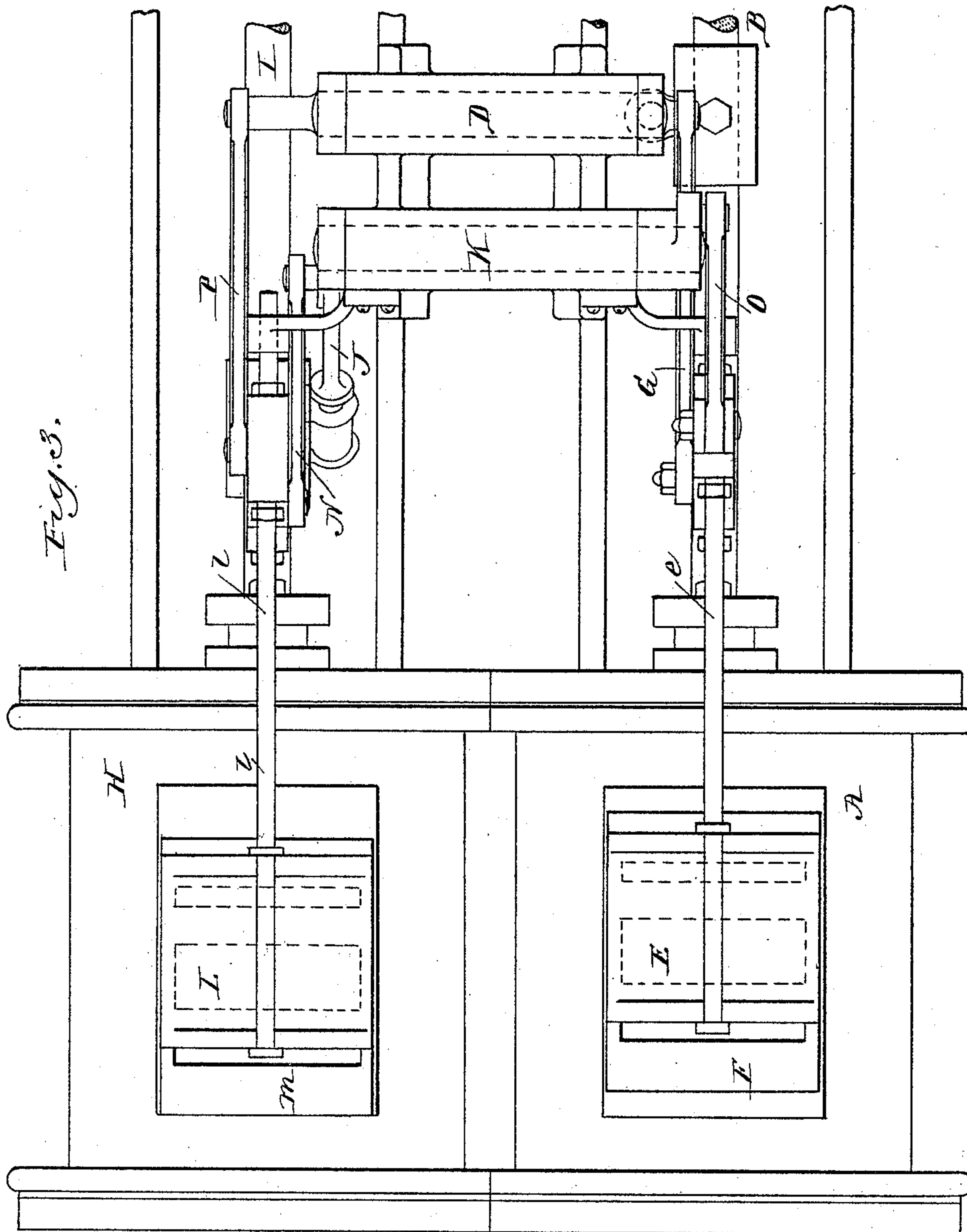
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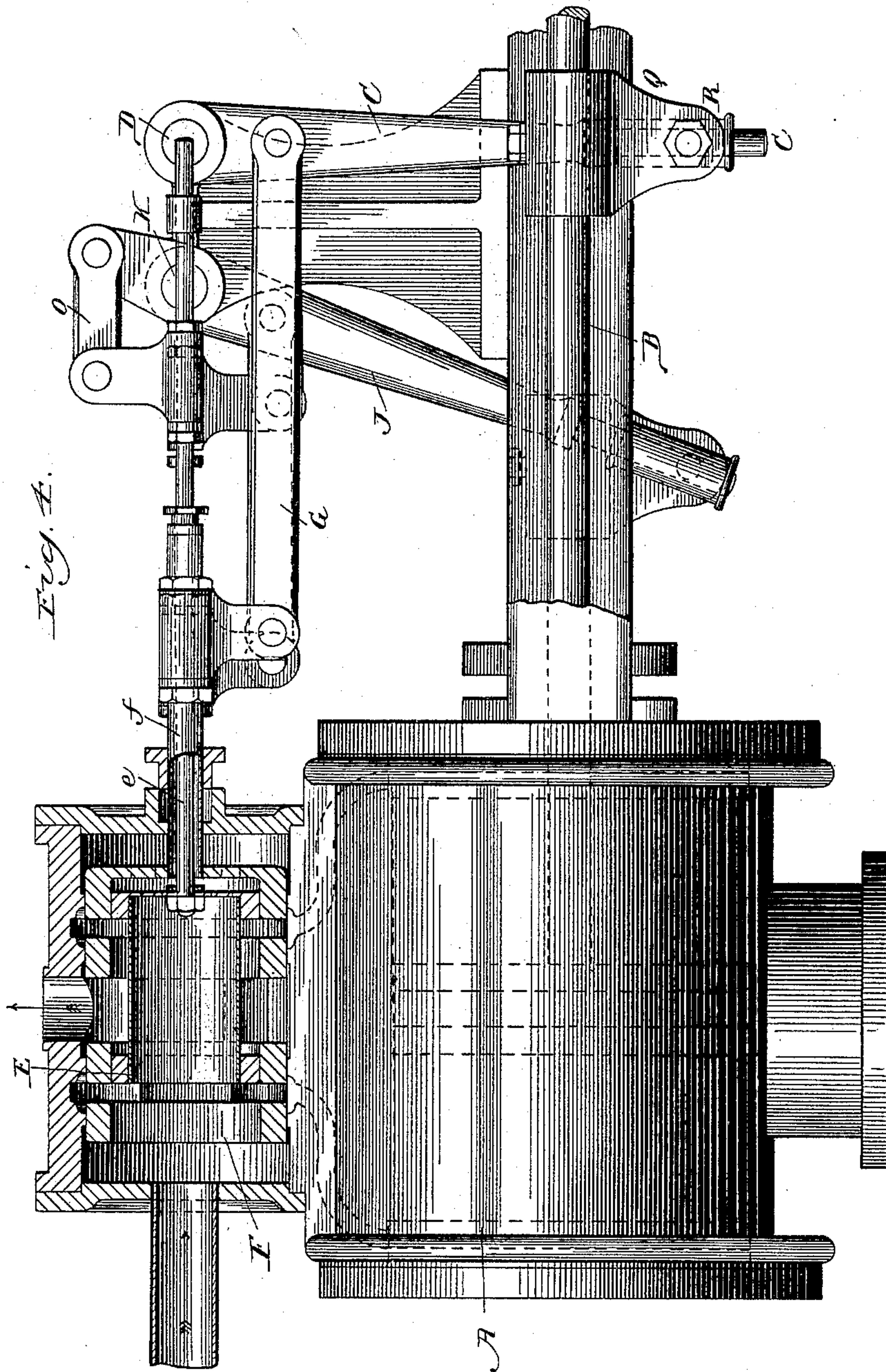
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# UNITED STATES PATENT OFFICE.

HARVEY F. GASKILL, OF LOCKPORT, NEW YORK; MARY E. GASKILL EXECUTRIX OF SAID HARVEY F. GASKILL, DECEASED.

## DUPLEX ENGINE.

SPECIFICATION forming part of Letters Patent No. 411,497, dated September 24, 1889.

Application filed July 13, 1888. Serial No. 279,841. (No model.)

*To all whom it may concern:*

Be it known that I, HARVEY F. GASKILL, of Lockport, New York, have invented certain new and useful Improvements in Duplex Engines, of which the following is a specification.

My invention relates to the valve motion of duplex engines.

Its object is to check the motion of the pistons before they reach the cylinder-heads.

To this end the invention in its main features consists in providing each engine of the duplex system with a movable valve-seat for its valve, and operating said valve-seat from the opposite engine to the one which operates the valve.

This invention relates to the same subject-matter as that patented to me October 4, 1887, No. 370,776. It differs from that invention in dispensing with the differential lever motion and using the movable valve-seat, thereby securing the same advantages.

In the accompanying drawings I have shown so much of the steam end of a duplex engine containing my invention as is necessary to a perfect understanding thereof.

In the drawings, Figure 1 is a side view with steam-chest removed. Fig. 2 is an end view from in front. Fig. 3 is a plan. Fig. 4 is a similar view to Fig. 1, but with a different form of valve—to wit, a piston-valve; and Fig. 5 is a section showing the valve, valve-seat, and ports in the position indicated in Fig. 1.

In these several figures A is the cylinder of the right-hand engine. B is its piston-rod.

C is an arm or lever oscillated by rod B.

D is a rock-shaft connected to lever C and rocked by it.

E is the valve of cylinder A. *e* is its stem.

F is the sliding valve-seat. *f* is its stem.

G is a link connected to a pin *c* on lever C at one end and to the stem *f* of the valve-seat F at its other end, so that valve-seat F is moved by the oscillation of lever C.

H is the cylinder of the left-hand engine.

I is its piston-rod.

J is an arm or lever oscillated by rod I.

K is a rock-shaft rocked by lever J.

L is the valve of cylinder H, and *i* its stem.

M is the movable or sliding valve-seat, and *m* is its stem.

N is a link connecting stem *m* with a pin *n* on lever J, so that valve-seat M is moved by the oscillation of lever J.

O is a link which connects an arm of rock-shaft K with valve-stem *e*, so that valve E is moved by the oscillation of lever J.

P is a link which connects an arm of rock-shaft C with valve-stem *i*, so that valve M is moved by the oscillation of lever C. Thus it will be seen the valve of each engine is operated by the other engine very much in the ordinary manner, and the movable valve-seat of each engine is operated by the engine to which it belongs. As a result of this arrangement, as each piston approaches the end of its stroke it moves its sliding valve-seat and closes its own ports, thus cushioning the piston.

Q is a block or cross head attached to the piston-rod B by a set-screw *b* or otherwise. R is a sleeve pivoted to the block Q, so as to be capable of oscillation. The end of lever C is dressed off so as to fit sleeve R and slide therein, thus providing for the requisite play as the parts move.

What I claim is—

The combination, substantially as set forth, in a duplex engine, of the two cylinders A and H, the valves E and L, each operated by the piston-rod of the cylinder to which it does not pertain, and the sliding valve-seats F and M, each operated by the piston-rod of the cylinder to which it does pertain.

HARVEY F. GASKILL.

Witnesses:

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F. P. LUCE.