

(No Model.)

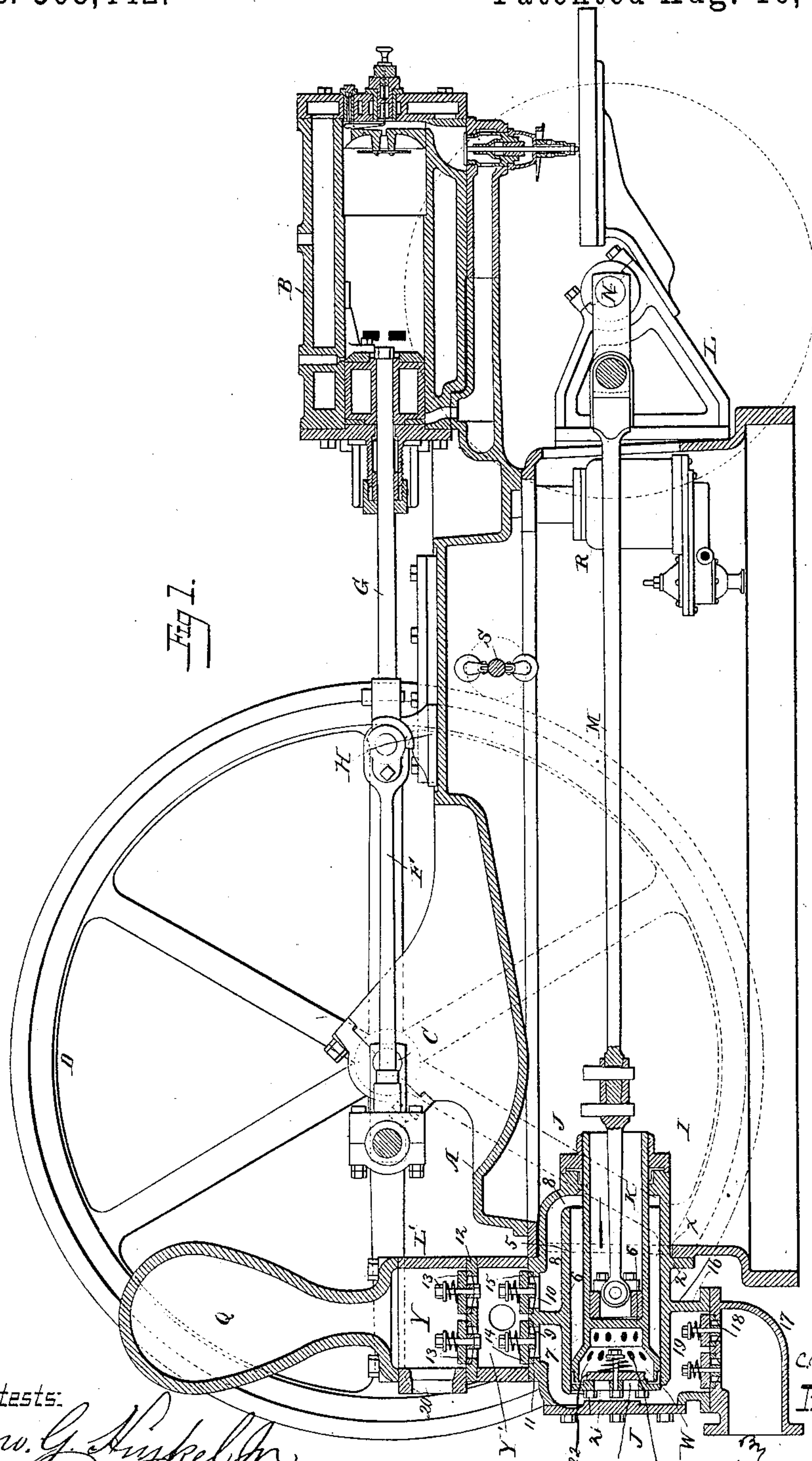
3 Sheets—Sheet 1.

C. W. BALDWIN.

PUMPING ENGINE.

No. 368,442.

Patented Aug. 16, 1887.



Attests:

Attests:
Jno. G. Kunkel Jr
A. E. Hansmann.

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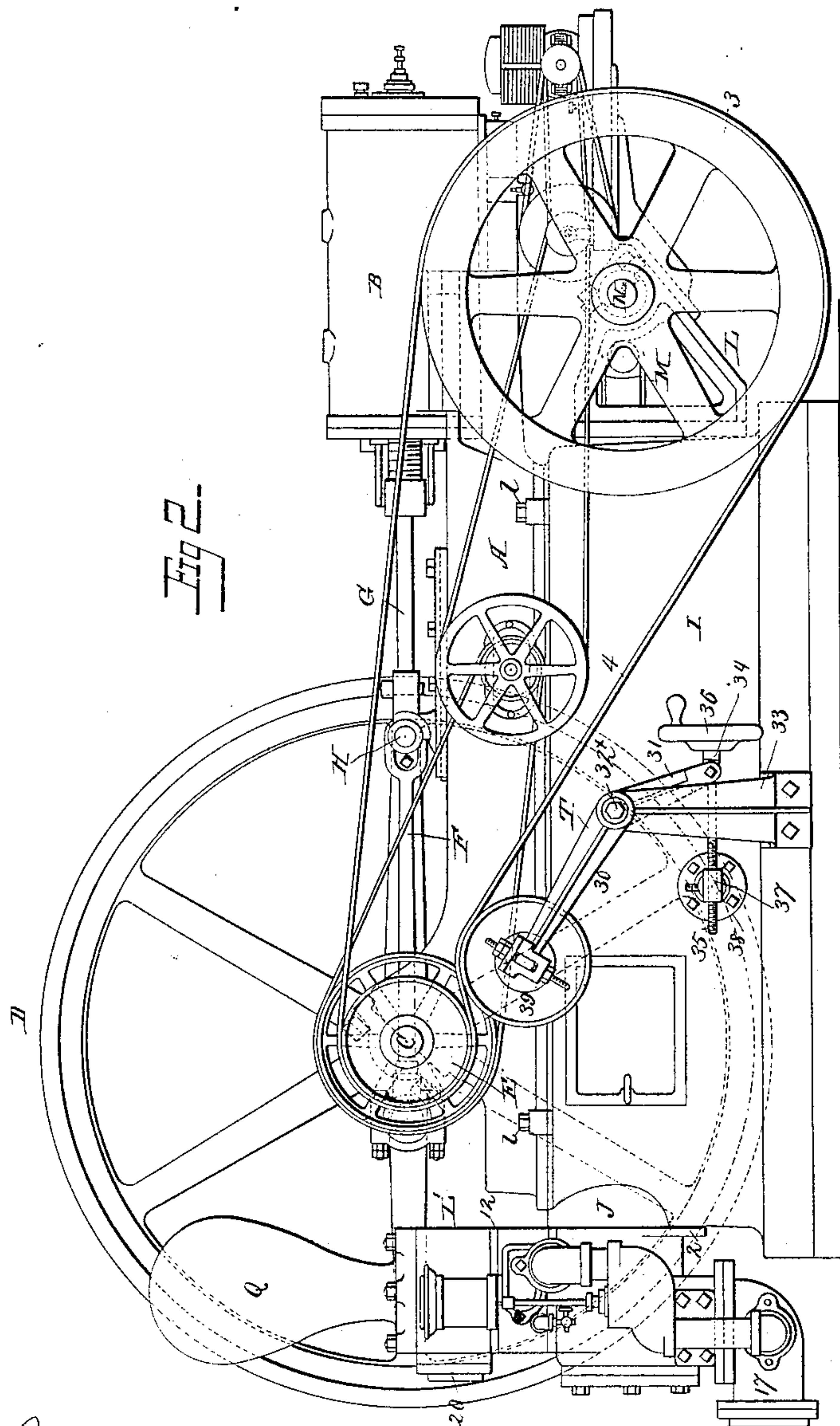
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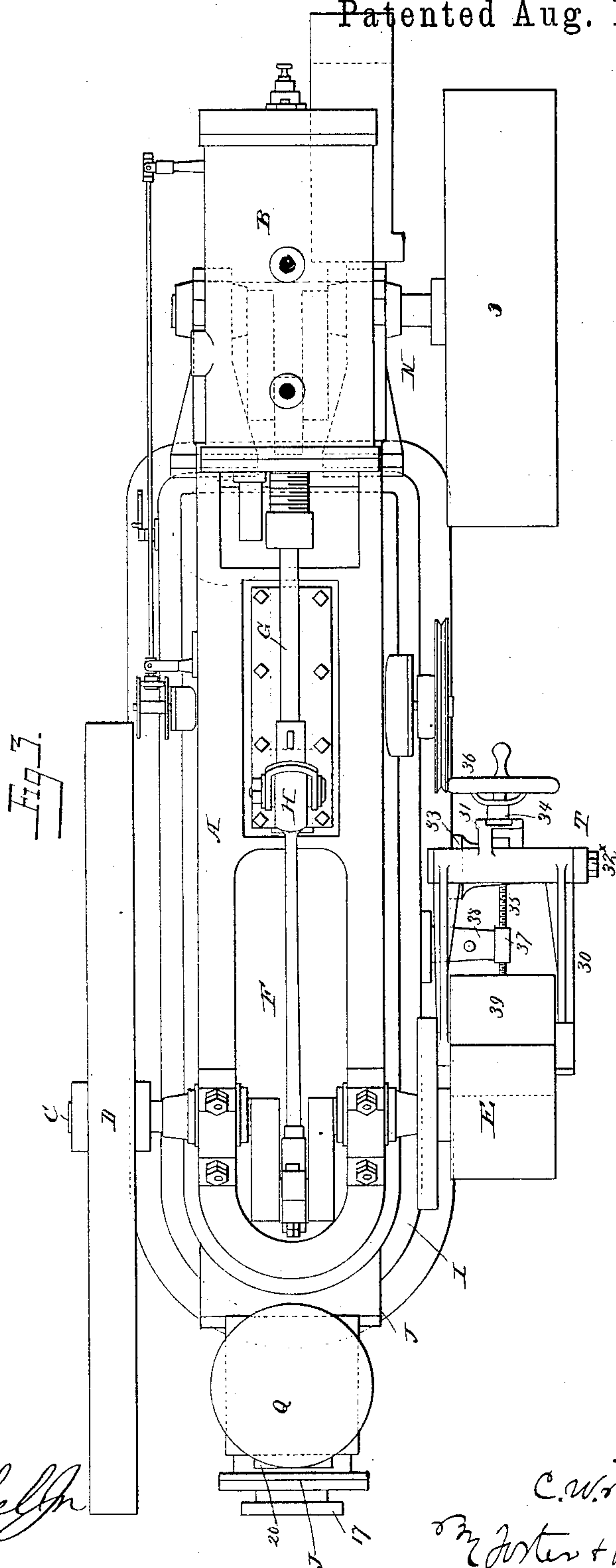
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UNITED STATES PATENT OFFICE.

CYRUS W. BALDWIN, OF YONKERS, NEW YORK, ASSIGNOR TO THE
HYDRAULIC ELEVATOR COMPANY OF CHICAGO, ILLINOIS.

PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 368,442, dated August 16, 1887.

Application filed June 25, 1886. Serial No. 206,246. (No model.)

To all whom it may concern:

Be it known that I, CYRUS W. BALDWIN, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Pumping-Engines, of which the following is a specification.

My invention has for its object to combine a pumping-engine and driving-engine in a compact space to secure greater efficiency, reduce friction, and facilitate the use of the driving-engine and pumping-engine separately, the invention being intended for use especially in connection with driving-engines employing an explosive gaseous mixture as a motive power.

In the drawings, Figure 1 is a sectional elevation of a combined driving and pumping engine, illustrating my invention. Fig. 2 is an external elevation. Fig. 3 is a plan view.

The upper bed or frame, A, of the engine consists of a single casting constructed at one end to form a support for the cylinder B, adapted to receive steam or an explosive mixture, and having near the opposite ends bearings for the crank-shaft C, provided with a fly-wheel, D, at one end and a band wheel or pulley, E, at the other, the crank being connected by the usual connecting-rod, F, to the piston-rod G, supported at the outer end by a cross-head, H, moving upon horizontal slides on the frame.

The parts above described constitute the parts of an ordinary steam or gas engine and may vary in construction.

The frame A is supported upon a bed, I, which is a hollow box or casing of cast metal with parallel sides and rounded front end, the open top being closed by the frame, which is securely fastened to the bed by bolts 1.

At the end of the bed nearest the crank-shaft is an opening, *a*, adapted to receive the cylinder or casing J of a pump, which may be of any suitable character; but, as shown, it is the cylinder of a differential pump having a trunk-piston, K, which slides through a packing-box at the inner end of the cylinder, the latter having an external flange, 2, which lies against and is bolted to the end of the bed I.

In brackets L, bolted to the end of the bed beneath the engine-cylinder B, turns a crank-

shaft, N, a connecting-rod, M, being connected to the crank of the shaft N at one end and to a cross-pin inside of the trunk-piston K at the other, and extending longitudinally through the bed, which has an opening at the rear end sufficient for the passage and play of the connecting-rod.

Upon one end of the crank-shaft N is a band-pulley, 3, around which and around the pulley E passes a belt, 4, through the medium of which motion is transmitted from the driving crank-shaft C of the engine to the shaft N of the pump.

By the arrangement above described I support both the engine and the pump upon a single bed, while the entire apparatus occupies but little more space in length than would be required for the bed of the engine alone. I also secure an extended throw of the pump-piston, and am enabled to use a connecting-rod longer than the bed itself, thereby avoiding lateral thrust upon the pump-piston and greatly reducing friction and wear. In addition to this, the increased weight upon the bed I, resulting from the attachment of the pump thereto, imparts increased stability and a better foundation for the frame of the engine, which is desirable when the latter is run at high speeds and with a heavy fly-wheel.

In the construction of pump shown the pump-cylinder is open at both ends, and has two channels or passages, 7 and 8, separated from each other and communicating with the opposite ends of the open cylinder 5, one communicating with the port 9 and the other with the port 10 in the valve-plate 11, secured to or forming part of the top of the cylinder J.

To the top of the cylinder J is bolted a rectangular casing, L', surmounted by an air-vessel, Q, and divided horizontally by a valve-plate, 12, into two chambers, Y Y', spring-seated valves 13 14 15 closing the ports in the valve-plates 11 and 12, as shown.

To a neck or extension, 16, of the cylinder J is bolted an elbow, 17, connected with the inlet-pipe of the pump, a valve-plate, 18, provided with ports and spring-seated valves 19, extending across the elbow or neck.

In the piston K is a partition, 6, forming, with the end 21 thereof, a chamber, W, with an opening, 31, to which is fitted a valve, 22,

spring-seated, and openings 32 put the chamber W in communication with the contracted trunk of the piston. The outlet-pipe 20 of the pump communicates with the chamber Y of the casing L'. When the piston K moves in the direction of its arrow, Fig. 1, the valve 14 closes, the valves 19 rise, and water flows into the forward end of the pump-cylinder, while water from the opposite end is forced through the channel 8 and chambers Y' Y into the pipe 20, the valves 15 and 13 rising. On the reverse movement of the piston the water is forced from the forward end of the cylinder through the channel 7 and chambers Y' Y, the valves 14 13 rising, the valves 15 and 19 being seated, and a portion of water also flowing through the port 31 in the end of the piston and through the openings 32 into the space surrounding the piston within the cylinder 5. When a gas-engine is used in connection with the pumping mechanism, the reservoir R may be arranged in and concealed by the bed I, as shown, while the governor S may be mounted upon a shaft having its bearings within the hollow frame A of the engine, thereby avoiding the exposure of these parts and economizing space.

In order to maintain the driving-belt 4 taut, I use a belt-tightener, which is mounted upon or supported by the bed I. Thus a frame, T, having a pair of arms, 30 30, and a forked arm, 31^x, at an angle to the arm 30, rocks upon a rod, 32^x, supported at one end by the bed I and at the other by a bracket, 33, bolted to the bed. The forked arm 31^x carries a pivoted thimble, 34, through which extends a screw, 35, provided with a hand-wheel, 36, and fitting a pivoted nut, 37, rocking upon a bracket, 38, secured to the bed I. Between the arms 30 30 of the frame T turns the tightening-pulley 39, which lies beneath the under portion of the belt 4, and may be forced against the latter with any desired pressure by adjusting the frame T by means of the adjusting-screw 35.

Although I have described the bed and frame as formed in the way shown and in two parts, they may be differently constructed and in one piece. It will be seen, however, that by forming the two beds separately, as described, the engine may be removed and put upon another bed for use as an engine alone, and that the pumping device may be separated from the bed, leaving the engine for use alone. The bed I and its pumping devices, being detachable from the engine, may be used alone as a pump, motion being imparted to the pulley E from any other driving pulley.

Although I have shown belt-connections, any suitable connections may be used for driving one crank-shaft from the other.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination, in a pumping-engine, of a driving-cylinder, piston, crank-shaft, and

connections, and a pumping-cylinder, piston, crank-shaft, and connections, all carried by a single bed or frame, the parts of the pump being supported thereby beneath the parts of the engine, the two cylinders being at the opposite ends of the structure, substantially as set forth.

2. The combination, with a supporting bed or frame, of a driving-cylinder and crank-shaft supported in bearings at the upper portions of the frame, a pumping-cylinder and crank-shaft supported in bearings upon the frame below those of the driving-engine, and connections between the shaft of the driving-engine and the shaft of the pump, the two cylinders being at opposite ends of the structure, substantially as set forth.

3. The combination, with a driving-engine, of a hollow bed supporting the driving-engine at the top of the bed, having bearings beneath the cylinder of the driving-engine for the crank-shaft of the pump, a connecting-rod extending between the pump-piston and the lower crank-shaft through the bed, and connections between the two crank-shafts, substantially as set forth.

4. The combination, with the driving-engine, of a hollow bed supporting the same at the top, a pump-cylinder extending through an opening at one end of the bed and bolted to the latter, a crank-shaft supported at the opposite end of the bed below the cylinder of the driving-engine, and a connecting-rod extending between the piston of the pumping-cylinder and the lower crank-shaft, substantially as set forth.

5. The combination, with the driving-engine, of a hollow bed supporting the same, a pumping-cylinder supported at one end of and extending into the bed and provided with a trunk-piston, and a crank-shaft supported at the opposite end of the bed and connected to the trunk-piston by a rod extending through the bed, substantially as set forth.

6. The pumping-cylinder, piston, crank-shaft, and connecting-rod supported upon a common bed, in combination with a separable frame or bed supporting the cylinder and shaft and connections of a driving-engine, and supported upon the bed of the pumping-cylinder, and connections between the engine-shaft and pump-shaft, substantially as described.

7. The combination of the motor-engine, hollow bed, pumping-cylinder, and connections supported by the bed below the gas-engine, band-pulleys upon the crank-shafts of the pumping and gas engines, and a band extending round both pulleys, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CYRUS W. BALDWIN.

Witnesses:

WM. H. SWENY,
JOHN T. GAWRY.