(No Model.)

G. B. MASSEY.

COMPOUND BEAM ENGINE

No. 257,355. Patented May 2, 1882.

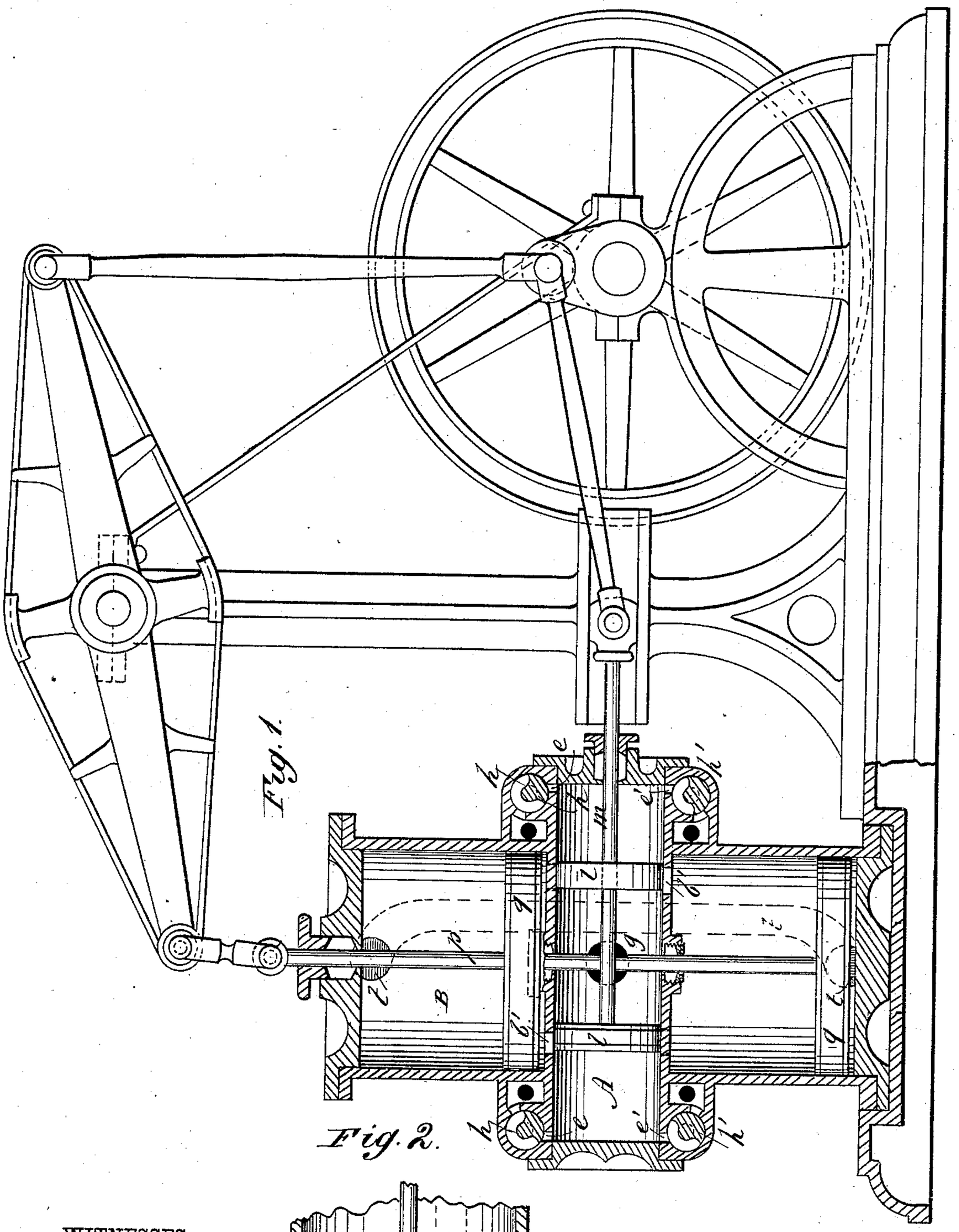
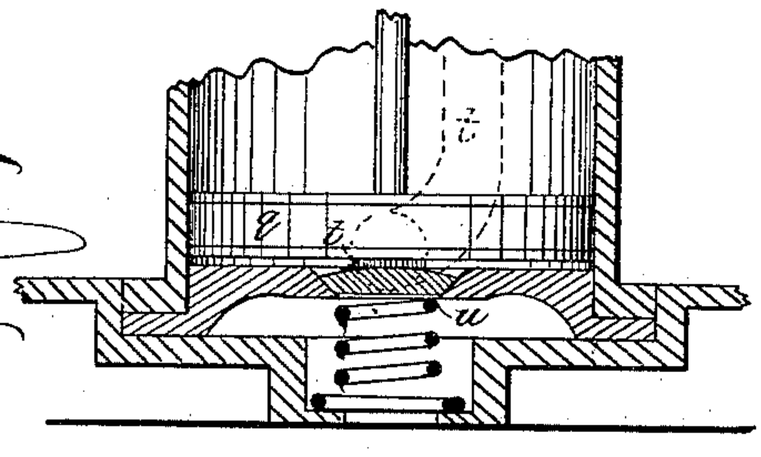


Fig. 1.

Fig. 2.



WITNESSES:

C. Neveux

C. Sedgwick

INVENTOR:

G. B. Massey

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

GIDEON B. MASSEY, OF NEW YORK, N. Y., ASSIGNOR TO JACOB LORILLARD, TRUSTEE, OF SAME PLACE.

COMPOUND BEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 257,355, dated May 2, 1882.

Application filed December 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, GIDEON BLACKBURN MASSEY, of New York, in the county and State of New York, have invented a new and useful Improvement in Compound Beam-Engines, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, forming part of this specification.

My improvements relate to the class of engines in which low-pressure cylinders for using the exhaust-steam are combined with the cylinders using steam under high pressure.

The object of my invention is to obviate the difficulty heretofore experienced from back-pressure and long openings and connecting-pipes, which I accomplish by direct and continuously open connections between the two cylinders and a compound piston in the high-pressure cylinder, by which the primary and secondary exhausts are regulated, as hereinafter described.

The present application forms the second part of a division of original application No. 47,201, filed December 2, 1881, of which original application the first part is shown and described in Letters Patent No. 252,485, dated January 17, 1882.

In the accompanying drawings, Figure 1 shows a sectional elevation of my invention as applied to a beam-engine; and Fig. 2 represents a portion of the low-pressure cylinder, showing a modification.

In the Letters Patent No. 252,485 I have shown a high-pressure cylinder having two pistons upon the same rod and provided with steam-ports at its ends and an exhaust-port at its midlength and at each end, in combination with a low-pressure cylinder placed alongside the high-pressure cylinder and communicating therewith by direct ports and having a single piston.

In the present invention I have modified the general construction above described so as to adapt the compound cylinders to use in connection with a beam-engine. Instead of arranging the cylinders alongside each other, I place the low-pressure cylinder B in a vertical position, with its rod *p* connected to the beam, and the high-pressure cylinder A in a horizontal position, with its rod *m* connected to a crank on the shaft. The cylinder A passes through the cylinder B at its midlength, the longitudinal axis being removed from the center line to allow passage of the piston-rods, and in the sides of cylinder A are the ports *b' b'*, that admit steam to cylinder B. In this case, the low-pressure cylinder being divided, I provide two pistons, *q q*, secured to the same rod *p* and working in the opposite ends of said cylinder. With this construction the cylinder B needs no heads on its ends for its proper working; but I prefer to use heads, as shown, and connect the cylinder ends by a pipe, *t*, that allows the inclosed air to pass back and forth as the pistons reciprocate.

At the ends of cylinder A are the exhaust-ports *e e* and the steam-ports *e' e'*, communicating with the main steam and exhaust openings, and at the midlength of cylinder A is the exhaust-port *g*, as shown in my other invention above referred to. The valves *h h'* are fitted in connection with the ports *e e'*, and are to be provided with suitable means for their operation. *l l* are the pistons of cylinder A, secured upon the rod *m*. When the pistons *l* of the high-pressure cylinder A are in the position shown in Fig. 1 the steam in the lower chamber of cylinder B exhausts through the lower port *b'* into the space between pistons *l*, and thence through the exhaust-port *g*. At the same instant steam is admitted into the upper chamber of cylinder B through the upper port *b'*, and the pistons *q* of cylinder B are lifted to the top of their respective chambers. On the return-stroke of pistons *l* the upper port *b'* will be opened, so that the steam in the upper chamber of cylinder B will exhaust into the space between the pistons *l*, and thence through the port *g*, while at the same time steam is admitted from cylinder A into the lower chamber of cylinder B through the lower port *b'*, which has been opened by the same movement of the pistons *l* that opened the upper port *b'*.

For use as an air pump or compressor the

cylinder B may be fitted, as shown, with a valve, *u*, in its lower end for inlet of air, and beneath the valve is a spring, *v*, for counteracting the weight of the valve, so as to prevent the usual clatter occasioned when the engine is slowed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In compound engines, the combination of the intersecting cylinders A B, communicating by ports *b' b'*, pistons *l l* on rod *m*, pistons *q q* on rod *p*, and the steam and exhaust ports *e' e g* of the high-pressure cylinder, substantially as shown and described.

2. In compound engines, the combination, with high-pressure cylinder A, of the low-pressure cylinder B, connected directly therewith, the pistons *q q*, rod *p*, and pipe *t*, substantially as shown and described.

3. In compound engines, the combination of two intersecting cylinders communicating with each other by open ports and a compound piston in the high-pressure cylinder fitted to act as valves for the low-pressure cylinder, substantially as shown and described.

The above specification of my improvement in compound beam-engines signed by me this 23d day of December, 1881.

G. B. MASSEY.

Witnesses:
C. SEDGWICK,
A. G. LYNE.