

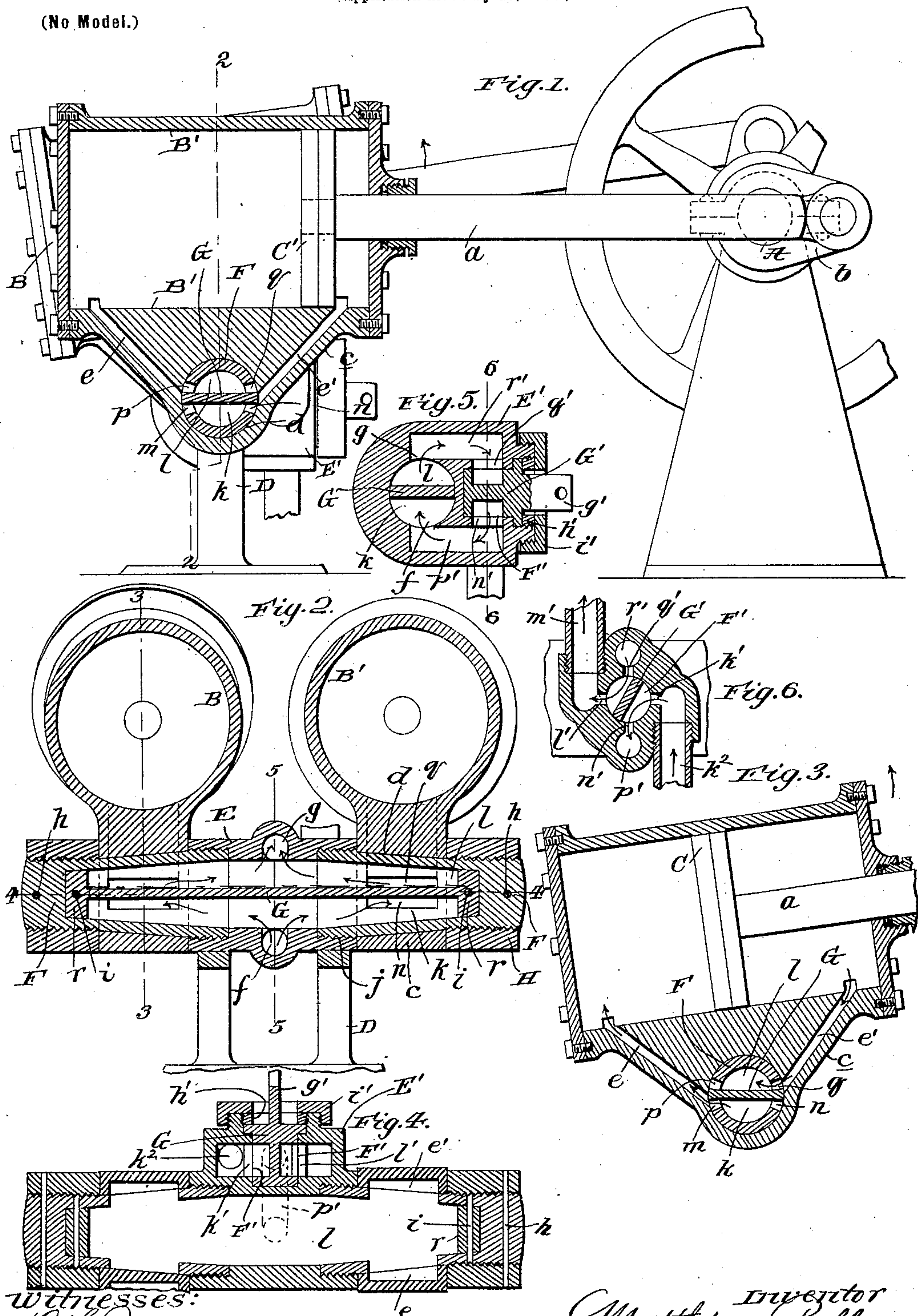
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Patented Sept. 17, 1901.

M. POLL.  
STEAM ENGINE.

(Application filed May 13, 1901.)

(No Model.)



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 682,743, dated September 17, 1901.

Application filed May 13, 1901. Serial No. 60,079. (No model.)

*To all whom it may concern:*

Be it known that I, MATTHIAS POLL, a subject of the Emperor of Germany, (but having declared my intention of becoming a citizen of the United States,) residing at Albuquerque, in the county of Bernalillo, Territory of New Mexico, have invented new and useful Improvements in Steam-Engines, of which the following is a specification.

10 My invention relates to improvements in steam, air, or other fluid pressure engines; and it consists in a peculiar and advantageous construction whereby steam is supplied to and exhausted from the cylinders without the  
15 employment of valve-gear and also in a simple and inexpensive valve through the medium of which the engine may be expeditiously reversed when desired.

20 With the foregoing in mind the invention will be fully understood from the following description and claims when taken in conjunction with the accompanying drawings, in which—

25 Figure 1 is a view of an engine constructed in accordance with my invention, with one of the cylinders in longitudinal central section and the piston in said cylinder in its foremost position. Fig. 2 is a transverse section taken on the broken line 2 2 of Fig. 1 and illustrating the cylinders in the same positions as in Fig. 1, and Fig. 3 is a longitudinal central section taken in the plane indicated by the broken line 3 3 of Fig. 2 and illustrating the left-hand cylinder in the position it assumes  
30 incident to the forward stroke of the piston therein. Fig. 4 is a section taken in the plane indicated by the broken line 4 4 of Fig. 2. Fig. 5 is a transverse section taken in the plane indicated by the broken line 5 5 of Fig. 2. Fig. 6 is a section taken at right angles to Fig. 5 and in the plane indicated by the broken line 6 6 of said figure.

35 In the said drawings similar letters of reference designate corresponding parts in all of the several views, referring to which A is the crank-shaft of a plural-cylinder engine in which steam, air, or other fluid pressure may be employed.

40 B B' are oscillatory cylinders, and C C' pistons movable in the cylinders and having their rods *a* connected to the cranks *b* of shaft A,

as shown. The cylinders B B' are arranged side by side and are peculiar in that they are provided with depending projections *c*, provided with transverse circular bores *d* and ports *e e'*, leading from said bores to points adjacent to the opposite ends of the cylinders. 55

D is a support or cradle which rises from the bed of the engine, and E is a hollow body which is arranged on and by preference suitably connected to the said support or cradle. This body E is provided at diametrically opposite points with ports *f g* and is also provided at its ends with interior threads *j*, these latter for the connection of the inner ends of the combined journals and valves F. These combined journals and valves are hollow and are divided by a diametrical partition G into steam-chambers lettered *k l*, respectively. They are provided, as shown, with ports *m n* in communication with the supply-chamber *k* and ports *p q* in communication with the exhaust-chamber *l*, and they are also provided with the outer solid end portions *r*, exteriorly threaded, as illustrated, to receive nuts H, which have for their purpose to hold the depending projections *c* of the cylinders on the combined journals and valves, as best illustrated in Fig. 2. The combined valves and journals are also tapered or gradually reduced in diameter toward their outer ends, and the bores *d* of the cylinder projections are correspondingly tapered, this to insure a snug fit between the cylinder projections and the combined valves and journals, on which said projections are free to oscillate, as will be more fully hereinafter pointed out. 80

The partition G in the preferred embodiment of the invention is formed separate from the combined valves and journals F and is provided at its ends with heads or circular enlargements snugly arranged in the inner ends of the valve-chambers, as shown. Diametrical pins *h* are passed through the nuts H and outer end portions of the valves F to hold the former against casual turning and becoming loose, and similar pins *i* are passed through the valves F and the end portions *r* of partition G to hold the same against turning with respect to each other. 95

On the forward side of the hollow body E is a projection E', (see Figs. 4 to 6,) in which 100



is formed a chamber  $F'$ , containing a valve  $G'$ , said valve having a stem  $g'$  and being secured in the chamber by a ring  $h'$  and cap-nut  $i'$ , as illustrated. The chamber  $F'$  is connected by a port  $j'$  with a steam-supply pipe  $k^2$  and by a port  $l'$  with a steam-exhaust pipe  $m'$ , and it is also connected by a port  $n'$  with a passage  $p'$ , leading to the port  $f'$  in the lower chamber  $k$ , and by a port  $q'$  to a passage  $r'$ , leading to the port  $g$  in the upper chamber  $l$ .

In practice the cylinders  $B B'$  are arranged, as shown, with reference to the cranks of the shaft  $A$  and the combined journals and valves  $F$ , and consequently it will be seen that the cylinders are free to oscillate on said valves and journals, with the result that with the valve  $G'$  in the position shown the cylinder-port  $e'$  will be registered with the port  $q$  of the complementary valve  $F$  to permit steam to exhaust from the forward end of the cylinder  $B$ , incident to the forward stroke of the piston in said cylinder, and the cylinder-port  $e$  will be registered with the port  $m$  of said valve to supply steam to the rear end of the cylinder, while incident to the rear stroke of the piston the cylinder-port  $e$  will be registered with the valve-port  $p$  to permit steam to exhaust from the rear end of the cylinder, and the cylinder-port  $e'$  will be registered with the valve-port  $n$  to supply steam to the forward end of the cylinder. The cylinder  $B'$  rocks forward incident to the rear movement of the cylinder  $B$  and rearwardly in concert with the forward movement of said cylinder  $B$ . During the forward movement of the piston in the cylinder  $B'$  the port  $e'$  of said cylinder is registered with the port  $q$  of the complementary valve to exhaust steam from the forward end of the cylinder, and the cylinder-port  $e$  is registered with the valve-port  $m$  to supply steam to the rear end of the cylinder, while during the rear movement of the piston in cylinder  $B'$  the cylinder-port  $e$  is carried into register with the valve-port  $p$  to exhaust steam from the rear end of the cylinder and the cylinder-port  $e$  is carried into register with the valve-port  $n$  to supply steam to the forward end of the cylinder.

It will be readily appreciated from the foregoing that in addition to controlling the supply of steam to and the exhaust of steam from the oscillatory cylinders without the employment of valve-gear of any kind the valves  $F$  serve to support the cylinders and form journals on which the cylinders are free to oscillate.

When the valve  $G'$  is turned from the position shown into such position as to establish communication between the ports  $l' n'$  and communication between the ports  $k'$  and  $q'$ , (see Fig. 6,) steam will be supplied to the cylinders through the chamber  $l$  and exhausted from the cylinders through chamber  $k$ , with the result that the movements of the cylinders and pistons will be the reverse to that described in detail, or, in other words, the engine will be reversed. The turning of the

valve  $G'$  and the consequent reversal of the engine may obviously be very quickly and easily accomplished.

It will be appreciated from the foregoing that my improved engine is practically valveless and also that it is susceptible of being actuated by steam, air, or other fluid pressure. Therefore I desire it understood that the word "steam" as herein used is intended to comprehend any and all kinds of fluid-pressure.

I have entered into a detail description of the construction and relative arrangement of parts embraced in the present and preferred embodiment of my invention in order to impart a full, clear, and exact understanding of the same. I do not desire, however, to be understood as confining myself to such specific construction and arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my claims.

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

1. In a steam-engine, the combination of a suitable support, a hollow body mounted on the support and having upper and lower steam-chambers and also having a projection containing a chamber  $F'$  connected with said steam-chambers and also connected with steam supply and exhaust conduits, a reversing-valve in said chamber  $F'$ , a hollow valve connected to the body and having steam supply and exhaust chambers and ports in communication therewith; said valve being exteriorly tapered and provided at its outer end with screw-threads, an oscillatory cylinder having a taper bore receiving the valve, whereby the cylinder is supported by and free to oscillate on the valve, and also having ports leading from said bore to points adjacent to its opposite ends, and a nut mounted on the threaded end of the valve to retain the cylinder in position thereon.

2. In a steam-engine, the combination of a suitable support, a hollow body mounted on the support and threaded at its opposite ends and having upper and lower steam-chambers and also having a projection containing a chamber  $F'$  connected with said steam-chambers and also connected with steam supply and exhaust conduits, a reversing-valve in said chamber  $F'$ , hollow valves connected to the threaded ends of the body and having steam supply and exhaust chambers and ports in communication therewith; said valves being exteriorly tapered and provided at their outer ends with screw-threads, oscillatory cylinders having taper bores receiving the valves, whereby the cylinders are supported by and free to oscillate on the valves, and also having ports leading from said bores to points adjacent to their opposite ends, and nuts mounted on the threaded outer ends of the valves.

3. In a steam-engine, the combination of a



suitable support, a hollow body mounted thereon, and having steam supply and exhaust chambers and also having a threaded end, a hollow valve connected to the threaded  
5 end of the body and having steam supply and exhaust chambers and ports in communication therewith; said valve being exteriorly tapered and provided at its outer end with screw-threads, an oscillatory cylinder having  
10 a taper bore receiving the valve, whereby the cylinder is supported by and free to oscillate on the valve, and also having ports leading from said bore to points adjacent to its opposite ends, and a nut mounted on the threaded  
15 end of the valve to retain the cylinder in position thereon.

4. In a steam-engine, the combination of a suitable support, a hollow body mounted thereon and having threaded ends, hollow  
20 valves connected to the threaded ends of the

body and having ports; said valves being exteriorly tapered and provided at their outer ends with screw-threads, a diametrical partition extending through the body and valves  
and dividing the same into steam supply and 25 exhaust chambers, oscillatory cylinders having taper bores receiving the valves whereby the cylinders are supported by and free to oscillate on the valves, and also having ports leading from said bores to points adjacent to 30 their opposite ends, and nuts mounted on the threaded outer ends of the valves.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

MATTHIAS POLL.

Witnesses:

WILLIAM MOORE,  
GEO. SHOTTON.