(No Model.)

J. D. P. SCHENCK.

PUMPING ENGINE.

No. 490,312. Patented Jan. 24, 1893.

FIG. 1.

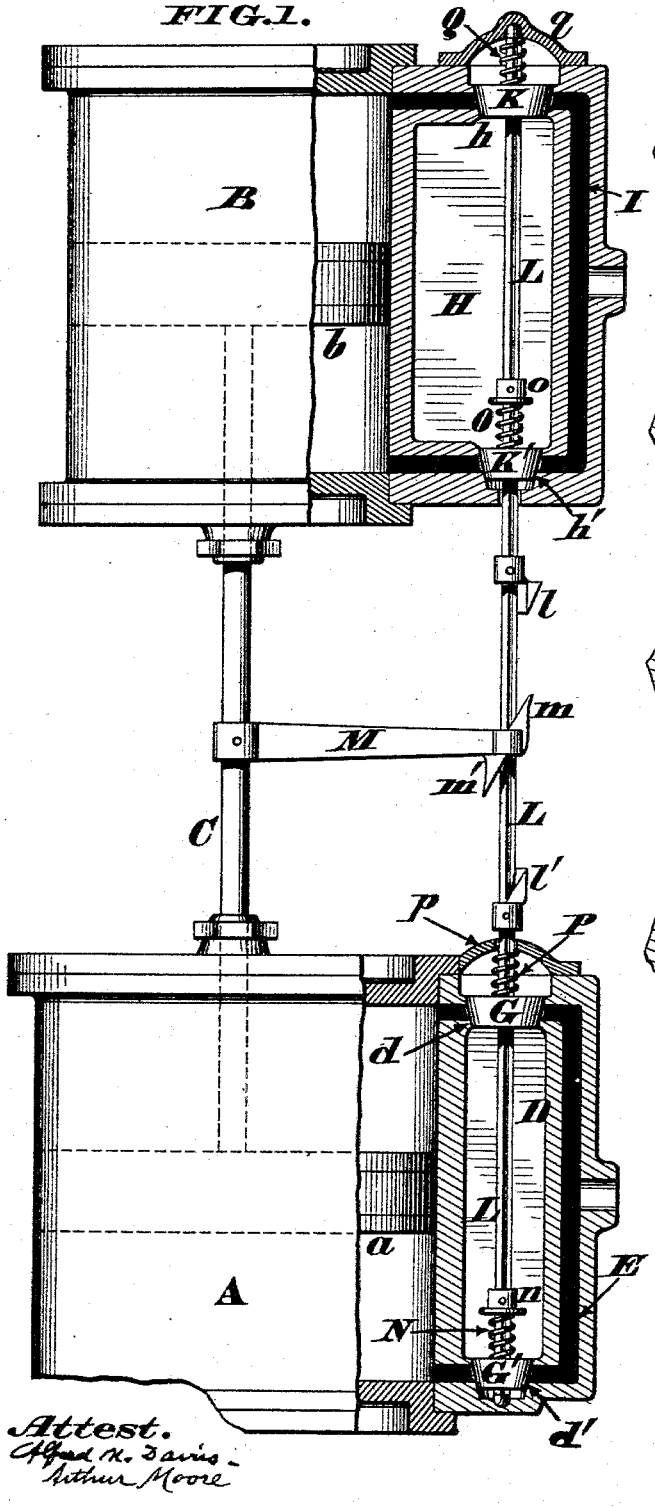


FIG. 2.

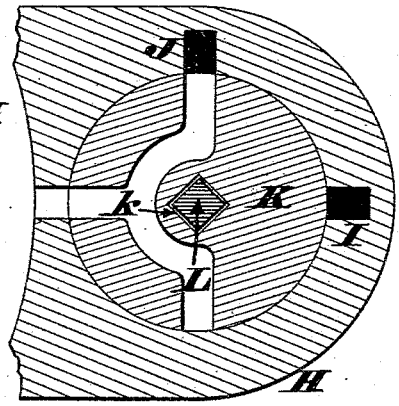


FIG. 3.

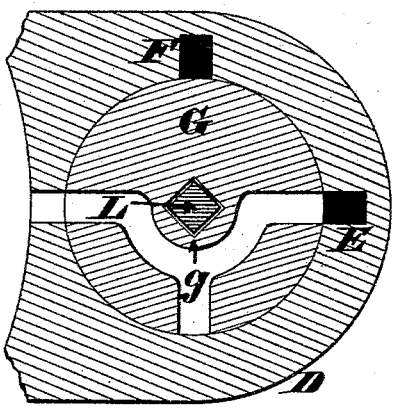
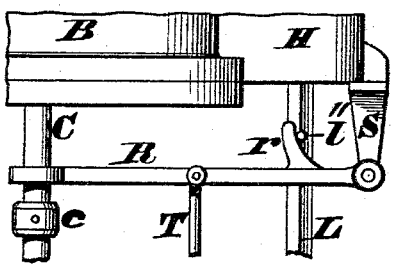


FIG. 4.



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PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 490,312, dated January 24, 1893.

Application filed February 23, 1892. Serial No. 422,406. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. P. SCHENCK, a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Pumping-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form part of this specification.

This invention relates to an air-pump or compressor which is capable of being used in connection with any approved system of air-brakes, and the first part of my improvements includes a novel combination of devices for simultaneously operating the valves of the pump and steam cylinder, the details of said combination being hereinafter more fully described.

The second part of my improvements comprises a novel combination of devices whereby each valve of the apparatus is capable of independent bearing on its own seat, although said valves are operated by a common stem or spindle, as hereinafter more fully described.

In the annexed drawings,—Figure 1 is a sectionized elevation of an air-pump or compressor embodying my improvements. Figs. 2 and 3 are horizontal sections of two of the valves of the same in different positions. Fig. 4 is a modification of the invention.

A represents the steam cylinder, and B the pump cylinder, which latter is preferably located above the former, and at such a distance as will permit the proper attachments being made to the rod C, connecting the pistons *a*, *b*. Cylinder A has at one side a chest D provided with a pair of valve seats *d*, *d'*, an inlet channel E, and an exhaust passage F, the latter being seen in Fig. 3. Adapted to bear within these seats *d*, *d'*, are three-way valves G, G', each valve being provided with ports, arranged as seen in said illustration, and having a central eye *g*. This eye must be square, or of the same non-circular shape as the common valve-stem or spindle, to be presently described. Cylinder B has at one side a chest H, in line with the chest D, and provided with a pair of valve-seats *h*, *h'*, an inlet-channel I, and an exhaust passage J, seen in Fig. 2. Adapted to bear within these seats *h*, *h'*, are three-way valves K K', whose ports are arranged to open communication with the inlet and exhaust channels. *k*, is a central non-circular eye in one of these valves. Furthermore, these upper valves K, K', must be accurately in line with the lower valves G, G', in order that said devices K, K', G, G', may be simultaneously operated by a common valve-stem or spindle L. This stem must be square or non-circular in transverse section, so as to impart the necessary reciprocating-rotary motion to the four valves, above referred to, the stem itself being actuated by any suitable mechanism. I prefer, however, to actuate it by an arm M, projecting rigidly from the piston-rod C, and provided at one end with a pair of reversely-inclined tappets *m m'*, adapted to alternately come in contact with wedges *l*, *l'*, properly secured to said stem. This stem carries also, a pair of collars *n*, *o*, between which and the valves G', K', coiled springs N, O, are fitted.

P, Q, are other coiled springs fitted between the valves G, K, and bonnets *p*, *q*, at the upper ends of the receptive steam-chests. These springs need not be very stiff, as their sole duty is to prevent the valves being lifted off their seats by any unusual jolting or shaking of the locomotive.

From the above description it is evident that when the connected pistons *a*, *b*, have about finished their upward stroke, the tappet *m*, will be brought in contact with the inclined plane *l*, thereby exerting a wedging action against the latter, the result being to turn the rock-shaft L, and with it the four valves applied thereto. This turning may be a quarter of a circle, more or less, but is sufficient to revolve the lower set of valves far enough to allow steam to enter the upper end of cylinder A, and escape from the bottom thereof, thus iniatiating a return stroke of piston *a*. The upper set of valves are simultaneously revolved with the lower set, and, as a natural result, fresh air is drawn in at one end of cylinder B, while compressed air is discharged at the other end thereof. It will thus be seen that the action of the four valves is prompt and positive, and as they simply re-

volve within their seats, there can be no violent and injurious pounding incidental to the use of puppet valves in this class of air compressors. It will also be evident that each valve has an independent bearing within its own seat, and on this account, any unusual wear of one valve has no tendency to render the other valves irregular in their actions. Again, by removing the bonnets *p*, *q*, and unfastening the wedges *l*, *l'*, the common valve stem L, can be withdrawn and then the valves G, G', K, K', can be removed from their bearings, which removal is facilitated by making the upper valves G, K, somewhat larger in diameter than the lower valves G', K'. But the valve stem can be made in three parts or sections, joined together at the places where the wedges *l l'*, are applied, which construction will still further facilitate the detachment of the various pieces of the engine or pump.

In the modification of my invention, seen in Fig. 4, the piston rod C, has a buffer *c*, attached to it, which buffer is adapted to elevate the free end of a lever R pivoted to a hanger S, depending from the chest H. Lever R has a cam or wedge *r*, that is forced against a pin *l''*, of valve-stem L, every time said lever is raised, said stem being turned back to its original position by a similar arrangement of lever, &c, applied to the upper end of the steam cylinder. T, is a link connecting these two systems of levers and causing them to operate simultaneously but in opposite directions.

I claim as my invention,—

1. The combination, in an air-compressor, of a steam cylinder having a chest provided with inlet and outlet passages and a pair of three-way valves, a pump cylinder having a chest provided with inlet and outlet passages and a pair of three-way valves, pistons traversing said cylinders and connected by a common rod, an arm projecting from said piston-rod and provided with a pair of actuating devices, and a single rock-shaft traversing said chests, without passing through their outer ends, and provided with a pair of bearings alternately operated by the actuating devices of said arm, the four three-way cocks being applied directly to said single rock-shaft, in order that they may all turn simultaneously and in the same direction, all as herein described.

2. The combination, in an air-compressor, of a steam cylinder and pump cylinder having valve-chests in line with each other, inlet and outlet passages and a pair of independently-seating three-way valves in each chest, a single rock-shaft to which said valves are directly applied, in order that they may turn simultaneously and in the same direction, and devices for rocking said shaft from the common piston rod of said cylinders, substantially as herein described.

3. The combination, in an air-pump or compressor, of the steam cylinder A, provided with a piston *a*, and chest D, having seats *d*, *d'*, passages E, F, and a pair of three-way valves G, G', a pump cylinder B, provided with a piston *b*, and chest H, having seats *h*, *h'*, passages I, J, and a pair of three-way valves K, K', a common valve-stem L, carrying said valves and wedges *l*, *l'*, a rod C, connecting said pistons *a*, *b*, an arm M, projecting rigidly from said rod and having inclined tappets *m*, *m'*, all as herein described.

4. The combination, in an air-pump or compressor, of a pair of independently-seating-three-way valves in the steam-cylinder chest, a pair of similar valves in the pump-cylinder chest, a common non-circular stem passing freely through said valves, collars attached to said stem, and springs applied between said collars and their respective valves, for the purpose described.

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

JOHN D. P. SCHENCK.

Witnesses:
JAMES H. LAYMAN,
ALFRED M. DAVIES.