(No Model.)

2 Sheets—Sheet 1.

T. H. ROBERTS.

AIR COMPRESSOR.

No. 572,314. Patented Dec. 1, 1896.

Fig. 4.

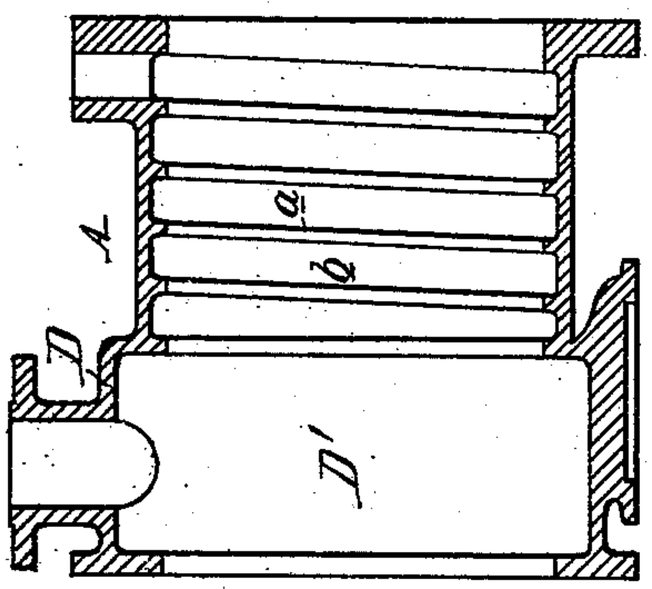
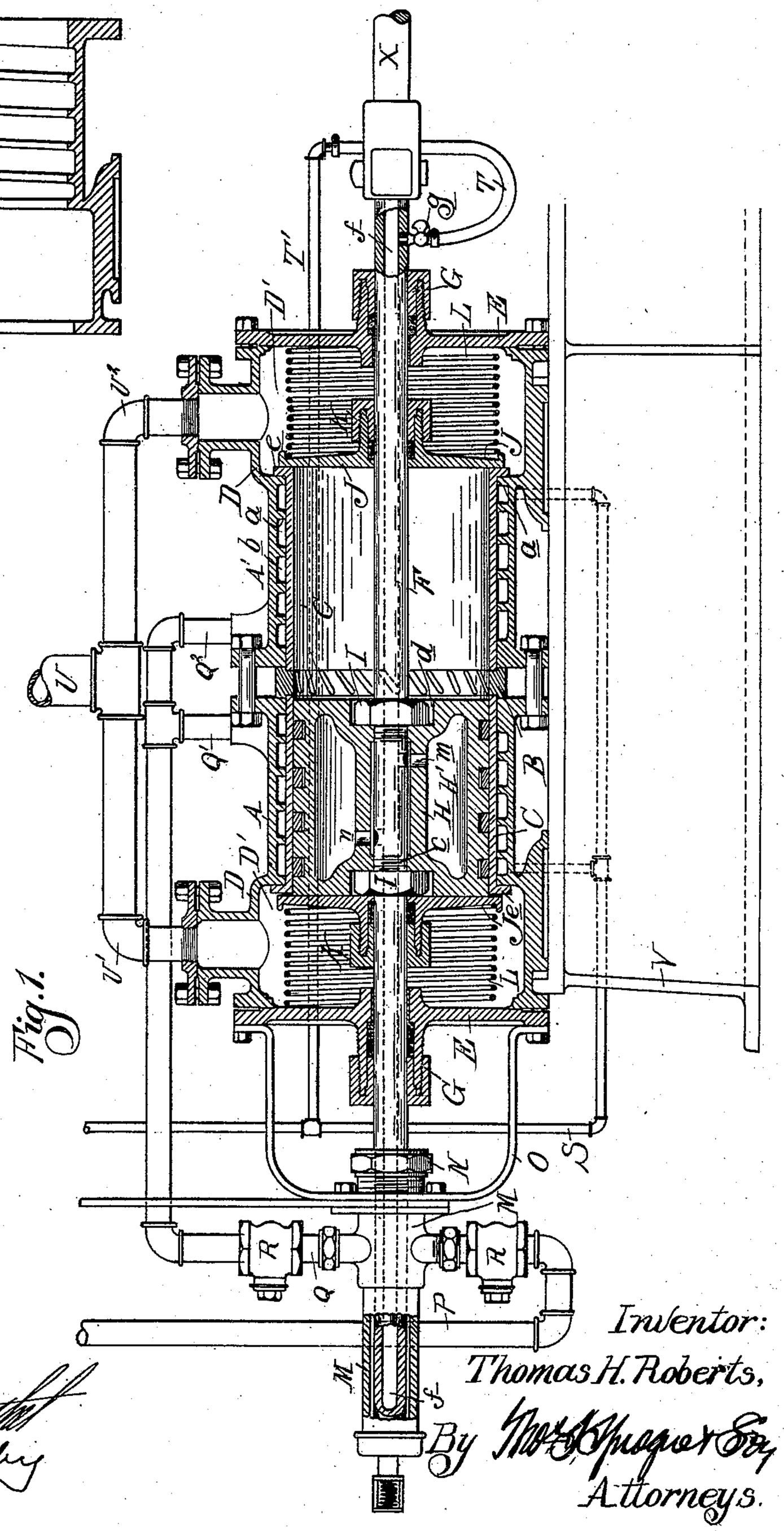


Fig. 1.



Witnesses:
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A. L. Habby

Inventor:
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Attorneys.

(No Model.) 2 Sheets—Sheet 2.

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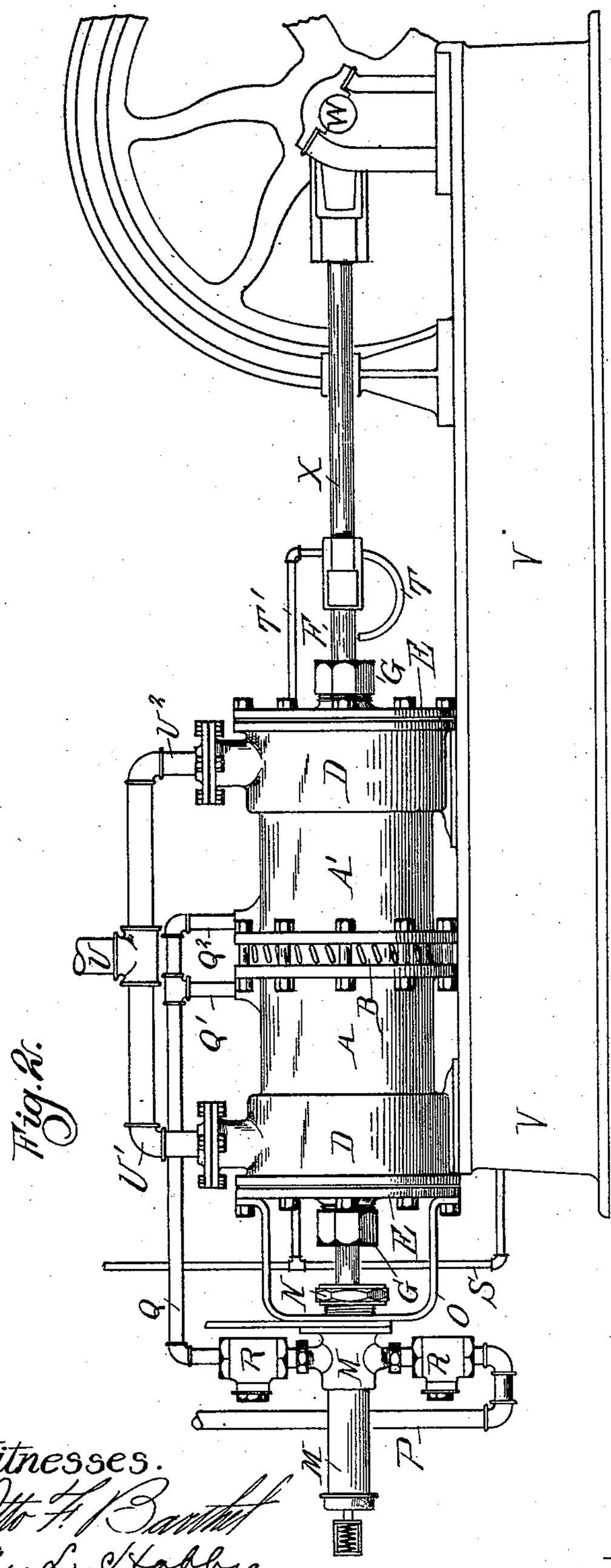

Fig. 2.

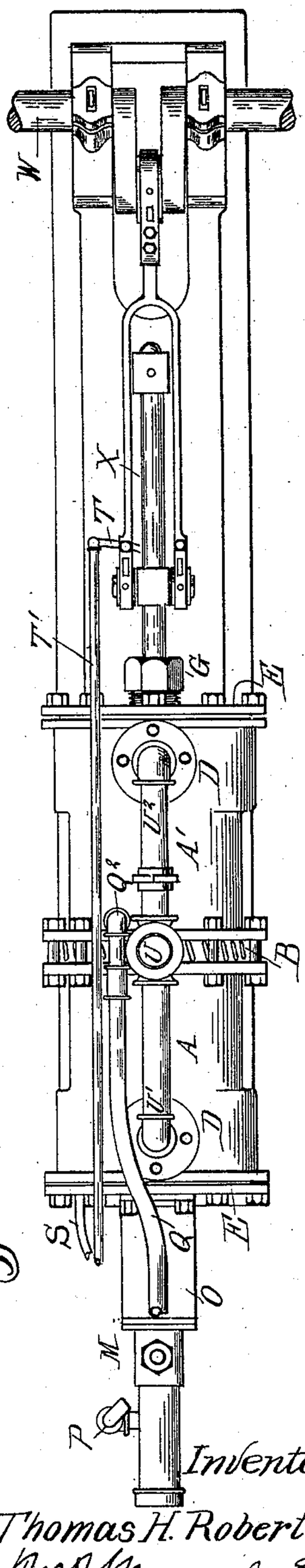

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

THOMAS HERBERT ROBERTS, OF DETROIT, MICHIGAN.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 572,314, dated December 1, 1896.

Application filed July 16, 1896. Serial No. 599,345. (No model.)

To all whom it may concern:

Be it known that I, THOMAS HERBERT ROBERTS, a subject of the Queen of Great Britain, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Air-Compressors, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to that type of compressors in which the air or gas is admitted centrally to the cylinder and is compressed alternately in the opposite ends thereof by the reciprocation of the piston.

It is the object of my invention to obtain a construction that is at once simple, cheap, and efficient; and the invention therefore consists in the peculiar construction, arrangement, and combination of parts, as more fully hereinafter described and claimed.

In the drawings, Figure 1 is a vertical central longitudinal section through my compressor. Fig. 2 is a side elevation thereof. Fig. 3 is a plan, and Fig. 4 is a section, through one of the sections of the compression-cylinder.

The cylinder of the compressor is formed in two sections A A′, secured together in axial line with each other and having the apertured ring B between their adjacent ends. Each section is provided with a narrow rib *a*, extending spirally around its inner surface, forming the spiral groove *b* between the adjacent convolutions of the rib.

C are linings or bushings fitting within the sections against the ribs *a*, their inner ends fitting into grooves in the ring B.

D are extensions of the sections A A′, provided with the heads or covers E at their outer ends and forming the enlarged chests or chambers D′.

F is a piston-rod extending through the cylinder and passing out through stuffing-boxes G on each of the covers E.

H is the piston-head, secured upon the rod F, preferably by means of the nuts I engaging with the screw-threaded portion *c* of the rod and fitting within recesses *d*, formed at opposite ends of the piston-head. This head is of a length to fill the space of one of the cylinder-sections A A′.

J are valve-disks sleeved upon the rod F within the chamber D, adapted to seat against the flanges *e*, formed at the outer ends of the linings C. K are stuffing-boxes on these disks, through which the rod F passes.

L are springs between the disks and covers E, normally holding the valves to their seats.

M is a pump-cylinder in rear of the main cylinder, into which the projecting end of the rod F extends, passing therein through the stuffing-box N and forming a reciprocating plunger.

O is a supporting-bracket for this cylinder, preferably secured to the main cylinder.

P is an inlet and Q is an outlet pipe connected with the cylinder M and being provided with a check-valve R. The inlet-pipe P is connected with a source of supply of water or other cooling fluid, and the outlet-pipe Q is connected by the branches Q′ and Q^2 to the spiral grooves or passages *b* in the cylinders A and A′, preferably at the inner ends thereof.

S is a return or discharge pipe connected to the opposite ends of the passages *b*.

f is a passage formed through the axis of the rod F, opened at its rear end and extending forward to a point beyond the forward end of the cylinder in the rear position of the piston.

g is a petcock at the side of the rod, connected with the forward end of the passage *f*.

T is a flexible tube connecting this petcock with a pipe T′, connected to the pipe S.

U is a pipe connected by the branches U′ and U^2 to the chambers D′ of the cylinders A A′ and forming a discharge-pipe from the compressor.

The cylinder is preferably mounted on a suitable base V, at the forward end of which is journaled the crank-shaft W, connected by the rod X to the piston-rod F.

In the operation of the device motion is imparted to the crank-shaft W through suitable connection with any source of power and from the crank-shaft through the connecting-rod X to the piston-rod F, reciprocating the piston H in the cylinder. As the piston moves from one cylinder-section into the other it will compress the air in the latter, forcing back the valve-disk J and discharging the compressed air into the chamber D′, from which it will pass into the discharge-pipe U.

At the same time a vacuum is being formed in the other section of the cylinder, which is quickly filled with the air entering through the ports in the ring B as soon as said ports are uncovered by the piston-head.

With each reciprocation of the piston a certain quantity of the cooling fluid is drawn into the cylinder M through the inlet-pipe P and then forced out again through the outlet-pipe Q, the check-valves in said pipe directing the flow. From the pipe Q the fluid passes through the branches Q′ and Q² into spiral passages *b* in the cylinder-sections A A′, finally passing out into the discharge or return pipe S. At the same time the cooling fluid is thus forced through the spiral passages *b* a small portion of the fluid in the cylinder M is forced through the passage *f* in the piston-rod F and through the petcock *g*, which serves to restrict the flow, then through the flexible tube T and pipe T′ into the pipe S. The piston-head H preferably has the chamber H′ formed therein, which communicates through the passage *m* and apertures *n* with the passage *f* in the rod. This circulation forms a cooling means for the piston and cylinder, conducting off the heat due to the compression of the air. The parts are further cooled by the expansion of the film of air still left in each cylinder-section upon the withdrawal of the piston therefrom and consequent formation of a partial vacuum.

What I claim as my invention is—

1. The combination with a piston and piston-rod, of a cylinder in which said piston is adapted to reciprocate, comprising two like sections secured together, with an apertured ring between their adjacent ends, each section having a chest at its outer end through which the piston-rod passes and outwardly-opening disk valves in said chests sleeved upon the piston-rod and adapted to seat on the ends of the cylinder.

2. The combination with a cylinder formed of two like sections secured together, with an apertured ring between, each section having a chest at its outer end, and outwardly-opening valves in said chests seated on the ends of the cylinder, of a piston adapted to fill the space of one of said cylinder-sections and to be reciprocated from one section to the other.

3. A compression-cylinder comprising the two like sections A A′ secured together with the apertured ring B between, each section having the rib *a* around its inner surface forming the groove *b*, and the extension D forming chests or chambers D′ the linings or bushings C fitting within the cylinder and shouldered into the ring B having the flanges *e* at their outer ends forming valve-seats, in combination with the piston, the piston-rod extending out through the chests and the valves J sleeved thereon adapted to seat on the flanges *e*.

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

THOMAS HERBERT ROBERTS.

Witnesses:

W. G. LARMOUR,

JOHN L. HANDY.