No. 761,598. PATENTED MAY 31, 1904.

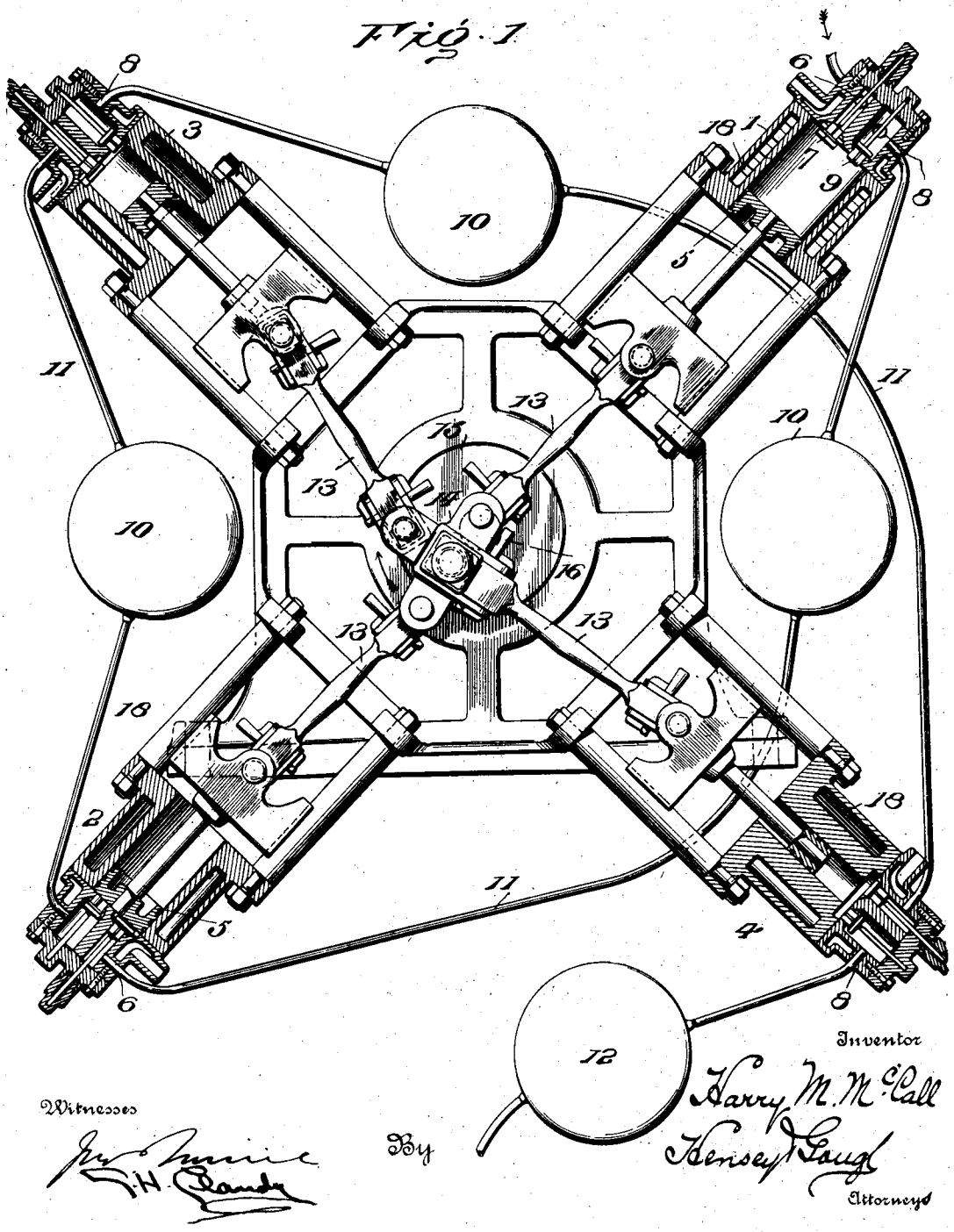
H. M. McCALL.

AIR COMPRESSOR.

APPLICATION FILED MAR. 7, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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By

Inventor

Harry M. McCall

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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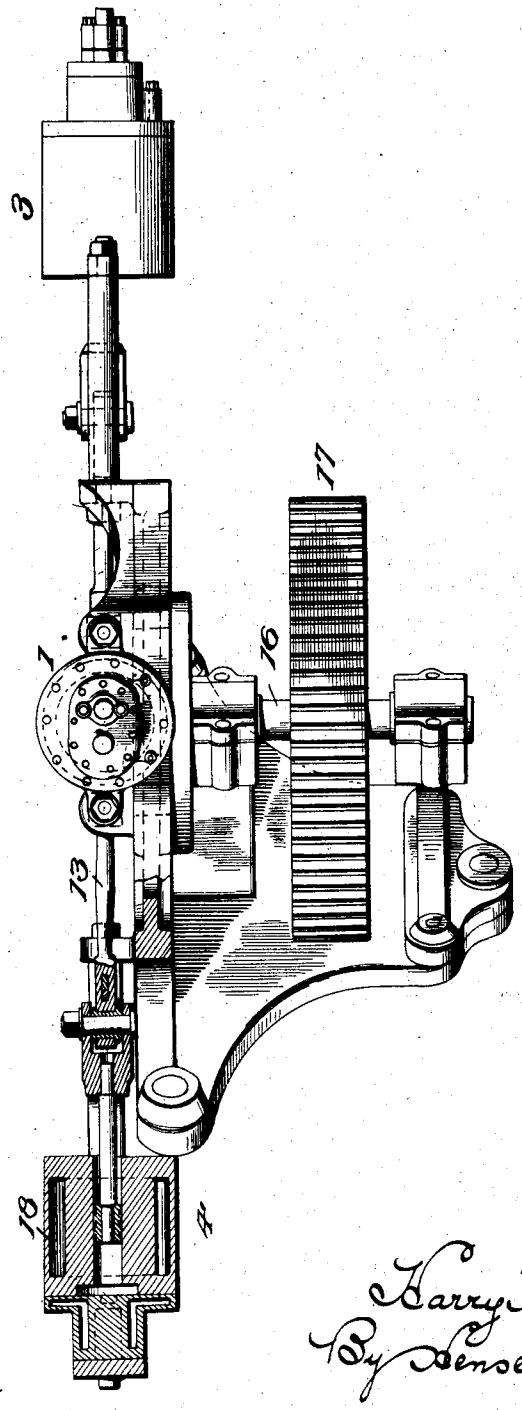


Fig. 2.

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No. 761,598. Patented May 31, 1904.

UNITED STATES PATENT OFFICE.

HARRY M. McCALL, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO PITTSBURG GAS ENGINE COMPANY, OF PITTSBURG, PENNSYLVANIA.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 761,598, dated May 31, 1904.

Application filed March 7, 1902. Serial No. 97,080. (No model.)

To all whom it may concern:

Be it known that I, HARRY M. McCALL, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, 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 air-compressors in which air is compressed in succession by a number of cylinders, the first cylinder taking in atmospheric air and after compressing it to a certain degree passing it to an intermediate receiver, which acts as a cooling means for the air heated by compression, the air passing from thence to a second cylinder, where it is again compressed to a still higher degree and then passed to a second receiver or cooler, and so on.

My invention consists in providing a stage compressor having the air pumps or cylinders radially arranged about a common center and communicating successively one with another, fitted with pistons of different areas, said pistons being connected together by a crank acting common to all and adapted to operate them successively, so that the air forced from one pump into the next acts on the opposite or outer side of the piston of the opposite or next pump, and so coöperates or assists in the making of the instroke.

In the accompanying drawings, Figure 1 is a top plan view of the air-compressor, partly in section. Fig. 2 is a side elevation of the air-compressor, partly in section.

The air-compressor consists of the cylinders 1, 2, 3, and 4. It will be observed that the size of the cylinder 1 is greater than that of the cylinder 2, while the size of the cylinder 2 is larger than that of cylinder 3, and also the size of the cylinder 3 is greater than that of cylinder 4. The cylinders are all similar in construction, the only substantial difference being in relative sizes. Therefore a description of the construction of one cylinder applies to all the cylinders. Referring to cylinder 1, the piston 5 is adapted to reciprocate in the interior of said cylinder. The cylinder 1 is provided at one end with an air-inlet port 6, a check-valve 7 being located in said port at the point where it enters the interior of the cylinder. Said check-valve is so mounted as to open when the piston 5 retreats and to close instantly when the piston 5 moves toward it. The end of the cylinder is also provided with an exit-port 8, said port having at the point where it enters the interior of said cylinder a check-valve 9, said check-valve being oppositely disposed to the check-valve 7—that is, the check-valve 9 is adapted to open as the piston 5 moves toward it and is adapted to be closed by back pressure of the compressed air in the port 8 when the piston 5 retreats. The port 8 is connected with an air-cooler 10, and the air-cooler 10 is connected, by means of the pipe 11, with the port 6 of the cylinder 2, while similar connections are made between the exit-port of the cylinder 2 and the inlet-port of cylinder 3 and also between the cylinder 3 and the cylinder 4, the exit-port 8 of the cylinder 4 being connected with the air-cooler 12. The pitmen 13 of the pistons 5 are pivoted at their inner ends to the wrist-pin 14, which in turn is mounted on a disk 15, said disk 15 in turn being fixed to the upper end of the shaft 16, said shaft 16 in turn being provided with a suitable gear-wheel 17.

The operation of the device is as as follows: Presuming the parts to be in position as shown in Fig. 1 and the disk 15 to be rotated to the right, as indicated by the arrow, the piston-head 5 of the cylinder 1 moves toward the valved end of the said cylinder, the compression of the air (which has previously been drawn into the said cylinder through the port 6) closes the valve 7, and the air rushes past the valve 9, through the outlet-port 8, into the cooler 10. At the end of its forward stroke when the piston 5 in the cylinder 1 begins to retreat the back pressure of the air from the cooler 10, through the outlet-port 8, instantly closes the valve 9, while a fresh charge of air is drawn in through the inlet-port into the interior of the cylinder 1.

In order to prevent overheated cylinders, they are surrounded each by a water-jacket 18.

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

A stage air-compressor consisting of a series of pairs of pumps radially arranged with relation to a common center and fitted with pistons of different areas, the low-pressure pump of each pair being in the same axial line as the high-pressure pump of the pair, a revolving crank connected with all said pistons and adapted to operate them successively, air connections between the low-pressure pumps and pumps of next higher pressure and adapted to lead the air from a lower-pressure pump to the next higher-pressure pump while the pistons thereof are moving in different directions and from the lowest-pressure pump successively through the intermediate pumps to the highest-pressure pump.

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

HARRY M. McCALL.

Witnesses:
ANNA ELIZ. STULL,
MARY L. MILLARD.