

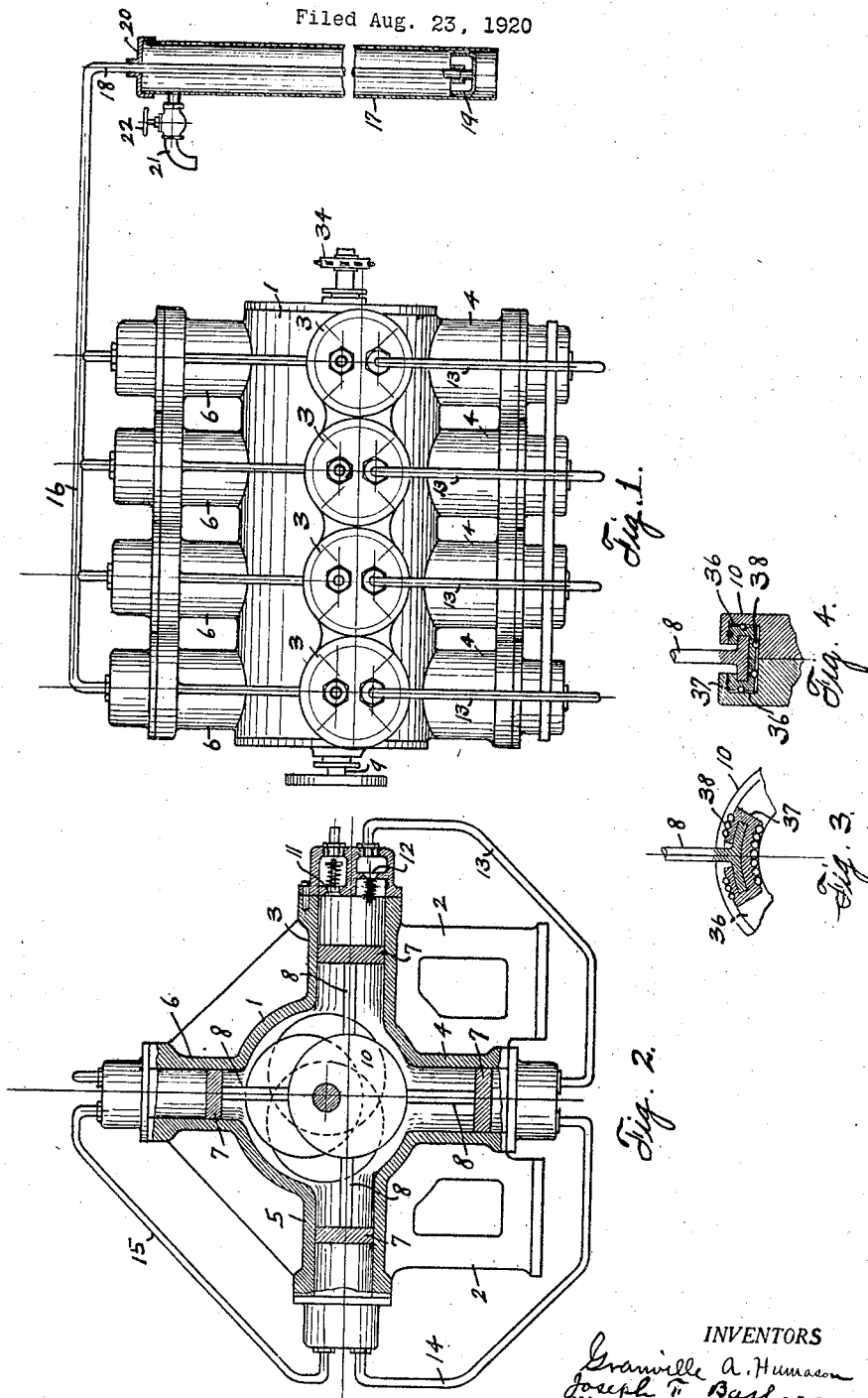
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G. A. HUMASON ET AL

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AIR COMPRESSOR

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UNITED STATES PATENT OFFICE.

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AIR COMPRESSOR.

Application filed August 23, 1920. Serial No. 405,329.

To all whom it may concern:

Be it known that we, GRANVILLE A. HUMASON and JOSEPH F. BASHARA, citizens of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in an Air Compressor, of which the following is a specification.

This invention relates to new and useful improvements in an air compressor.

One object of the invention is to provide an air compressor of the compound type provided with a plurality of series of cylinders which communicate with a common outlet manifold, the cylinders of each series ranging from low pressure to high pressure in uniform succession.

Another object of the invention is to provide an air compressor which is designed particularly for use in connection with pumping or forcing water from deep wells.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the compressor.

Figure 2 is a transverse sectional view, and

Figures 3 and 4 show fragmentary sectional views of the eccentric driving disc employed, showing its connection to the piston rod.

Referring now more particularly to the drawings wherein like numerals of reference designate similar parts in each of the Figures, the numeral 1 designates a cylindrical casing which is supported by suitable supporting legs 2, 2 formed integrally therewith. Formed integrally with this casing there are a plurality of series of cylinders, four series being shown. The cylinders of the different series are correspondingly arranged and are designated by the numerals 3, 4, 5 and 6. The cylinder 3 is a low pressure cylinder and the pressure increased in said cylinders in uniform succession from said low pressure cylinder 3 to the high pressure cylinder 6. Reciprocating in the respective cylinders are the pistons 7 which are fixed to the outer ends of the piston rods 8. There is a driving shaft 9 arranged axially within the casing 1 and having end

bearings therein, and this shaft is driven from a suitable motor (not shown). Fixed upon the shaft 9 are the eccentric discs 10, one for each series of cylinders and these discs are connected to the corresponding connecting rods 8 and drive the pistons 7 as the shaft 9 rotates. Each cylinder head has an inlet valve 11 and an outlet valve 12. Upon back stroke of the piston the air is drawn in through the inlet valve and upon outward stroke it is forced out of the outlet valve. The inlet valve of the cylinder 3 is open to free atmosphere and the outlet valve of said cylinder is connected to the inlet valve of the next succeeding cylinder by the pipe 13. The outlet valve of the cylinder 4 is connected to the inlet valve of the cylinder 5 through the pipe 14 and the outlet valve of the cylinder 5 is connected to the inlet valve of the cylinders 6, the cylinder 6 through the pipe 15, the outlet pipes of all uniting in a common manifold 16, through which air is delivered from the compressor. The numeral 17 designates a well casing into which the pipe 18, leading from said manifold, extends, and the lower end of said pipe 18 carries a suitable nozzle 19 which discharges upwardly. This nozzle is submerged in the fluid in the well and said fluid is lifted up through said casing by air pressure. The top of the casing 17 is closed by means of a cap 20, and leading from said casing there is an outlet pipe 21 which is controlled by the valve 22.

Each driving disc 10 is formed of two sections, as shown in Figure 4 and the inside of each section has an annular groove 36, said grooves coincide to form an annular raceway for the bearing 37. The inner end of each piston rod 8 is connected to said bearing, as shown in Figures 3 and 4, and interposed between said bearing and the walls of said raceway are anti-friction rollers as 38. As the discs rotate they reciprocate the piston rods 8 back and forth in a direct stroke, thus reciprocating the pistons 3.

What we claim is:—

1. An air compressor including a casing, a plurality of series of cylinders carried thereby, each series comprising a low pressure, intermediate, and a high pressure cylinder, each cylinder having an intake and an exhaust port, valves controlling said ports, pipes connecting the exhaust port of the cylinder with the intake port of the next succeeding cylin-

der, from low to high, a common manifold connected to the exhaust ports of the high pressure cylinder of each series, pistons in said cylinders an axially arranged drive shaft in said casing, eccentric discs fixed on said shaft in alignment with the respective series of cylinders, each disc having an annular raceway, a bearing in each raceway, and piston rods connected at their outer ends to said pistons and at their inner ends to said respective bearings.

2. An air compressor including a casing, a plurality of series of cylinders carried thereby, each series comprising a low pressure, intermediate, and a high pressure cylinder, each cylinder having an intake and an exhaust port, valves controlling said ports, pipes connecting the exhaust port of the cylinder with the intake port of the next succeeding cylinder, from low to high, a common manifold connected to the exhaust ports

of the high pressure cylinder of each series, pistons in said cylinders, an axially arranged drive shaft in said casing, eccentric discs fixed on said shaft in alignment with the respective series of cylinders, each having an annular raceway, a bearing in each raceway, anti-friction means between each bearing, and the walls of the raceway, piston rods connected at their outer ends to said pistons and at their inner ends to said respective bearings, and, a fluid pressure pipe connected to said manifold and extending down into a well bore.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GRANVILLE A. HUMASON.
JOSEPH F. BASHARA.

Witnesses:

E. V. HARDWAY,
WM. A. CATHEY.