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Patented Mar. 5, 1901.

F. J. A. KINDERMANN.

AIR COMPRESSOR.

(Application filed Oct. 27, 1900.)

(No Model.)

UNITED STATES PATENT OFFICE.

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AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 669,118, dated March 5, 1901.

Application filed October 27, 1900. Serial No. 34,593. (No model.)

To all whom it may concern:

Be it known that I, FRANZ JOACHIM ALEXANDER KINDERMANN, a subject of the Emperor of Germany, residing at No. 259 Elizabeth street, Melbourne, in the Colony of Victoria, have invented certain new and useful Air-Compressors, of which the following is a specification.

My invention provides an air-compressor which may be constructed on a large scale and employed for the ordinary purposes of air-compressors, or it may be made on a small scale and employed for the purpose of pumping inflatable tires of vehicles.

In order to make the invention clear, I will describe the same with reference to the accompanying sheet of drawings, in which—

Figure 1 shows a vertical section taken through the pump; Fig. 2, a vertical elevation; Fig. 3, a section taken on line A A of Fig. 1, and Fig. 4 a section taken on line B B of Fig. 1.

1 represents a cylinder, which is closed at its top by a cap 2. The cap 2 has a bore through which passes a piston-rod 3. Said piston-rod enters an inner and smaller cylinder 4 and terminates with a piston 5 within the said cylinder 4. The piston-rod 3 has a butt-piece 6 upon it, on which is mounted a washer 7, forming a packing, the piston-rod being secured in position by nut 8. The base of the cylinder 1 is provided with a valve constructed of leather ring 9, of L-section, held in position by screw-ring 10. The base of the cylinder 1 at its inside face is beveled out slightly, which forms a recess for the leather ring 9. The cylinder 1 fits loosely upon another cylinder 11, and said ring impinges against the latter. This cylinder is screwed at its base into a block 17, and its top is closed by a screw-cover 12. The cover 12 is provided with a valve 13. This valve is constructed similarly (though of smaller size) to the valve 21, hereinafter particularly described. The piston-rod 3 aforesaid passes through the cover 12, a packing-gland being provided at 14. The inner cylinder 4 aforesaid has a flange 15 or the like at its top, and a washer 16 is provided between the said flange 15 and the cover 12 of cylinder 11. The base of the cylinder 4 rests in a recess formed in block 17 and upon a washer 18. The annular space 28 between the cylinders

4 and 11 forms a jacket to the cylinder 4. The block 17 is screwed into base-block 19, which latter has a chamber 20. The cylinder 4 is in communication with the chamber 20 by means of valve 21. This valve has rod 22, with perforated head 23 and spiral spring 24 encircling the rod and lying within enlarged recess 25, formed in block 17. The block 17 is suitably formed at its base as a seat for the valve. A washer 26 is set between the blocks 17 and 19 to form an air-tight joint, and a pipe 27 enters the chamber 20.

I have illustrated means on the drawings for supplying water to the jacket 28, and which consists of pipe 29, (see Figs. 2 and 4,) which enters the block 17 and proceeds vertically through same and rises to near the top of the jacket 28.

30 represents a short pipe which proceeds from the jacket vertically through and out of block 17.

On Fig. 4 it will be seen that water may enter by pipe 30 near the bottom but outside of cylinder 4, while any air or the water itself may escape out of the jacket 28 by the pipe 29. (See Fig. 2, where the height of pipe 29 is shown by dotted lines.)

The *modus operandi* of the invention is as follows: On drawing up the cylinder 1 air will be drawn in at the valve 9 and will enter the chamber 31, so as to fill this said chamber, and on the return (downward) stroke this air will be forced through the valve 13 into the smaller chamber 32, (the valve 9 during this action being closed against the cylinder 11,) while the air previously compressed into the chamber 32 will be forced by the piston 5, moving downward with cylinder 1, through the valve 21 and pipe 27, away to where such compressed air is required for use. On the next upward stroke of the cylinder 1 with its piston a fresh supply of air will be drawn into the chamber 31 and the compressed air in the chamber 32 will pass from the back to the front side of piston 5 to be forced on the next downstroke past the valve 21 to the outlet or lead-away pipe 27. Water or other cooling fluid, if necessary, may be circulated through the jacket 28 by the inlet and outlet pipes 30 and 29, respectively.

Having now particularly described and ascertained the nature of my said invention and

in what manner the same is to be performed, I declare that what I claim is—

1. An air-compressor comprising an outer cylinder having a valve for the inlet of air into its chamber, an inner double cylinder with a cooling-space between the inner and outer walls thereof, a piston within the innermost cylinder and connected with the outer cylinder, valve communication between the chambers of outer cylinder and innermost cylinder and an outlet-pipe leading from the innermost cylinder substantially as and for the purposes set forth.

2. An air-compressor comprising cylinder 1 having valve 9 at its base, a double cylinder 11 and 4 with a cooling-space between the walls thereof, a piston in the cylinder 4 connected by rod to cylinder 1, a valve communication between cylinders 1 and 4, a chamber 20, a valve communication between said chamber and cylinder 4, and an outlet-pipe from said chamber substantially as and for the purposes set forth.

3. An air-compressor comprising cylinder 1 recessed at its base and having leather ring 9 projecting into said recess and held in position by ring 10, said cylinder being closed at its top by cap 2, a double cylinder 11 and 4 with a jacketing-space between, the cylinder 11 being of slightly less diameter than the cylinder 1 and being closed by cover 12 carrying valve 13 which opens into cylinder 4, a piston 5 in the cylinder 4 having rod 3 passing through cover 12 of cylinder 11 and having stop 6 and nut 8 for securing it to cap 2

of cylinder 1, a block 17 which receives the base of the double cylinder 11 and 4 valves 21, 22, 23, 24 in the said block, a base-piece 19 having chamber 20, and an outlet-pipe 27 from same substantially as and for the purposes described.

4. An air-compressor comprising cylinder 1 recessed at its base and having leather ring 9 projecting into said recess and held in position by ring 10, said cylinder being closed at its top by cap 2, a double cylinder 11 and 4, with a jacketing-space 28 between, the cylinder 11 being of slightly less diameter than the cylinder 1 and being closed by cover 12 carrying valve 13 which opens into cylinder 4, a piston 5 in the cylinder 4 having rod 3 passing through cover 12 of cylinder 11 and having stop 6 and nut 8 for securing it to cap 2 of cylinder 1, a block 17 which receives the base of the double cylinder 11 and 4, a valve 21, 22, 23, 24 in the said block, a base-piece 19 having chamber 20, and an outlet-pipe 27 from same, a short inlet-pipe 30 set in block 17 and entering jacketing-space 28, and long outlet-pipe set in block 17 and rising to near top of jacketing-space 28, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANZ JOACHIM ALEXANDER KINDERMANN.

Witnesses:

A. HARKER,
C. W. WADE.