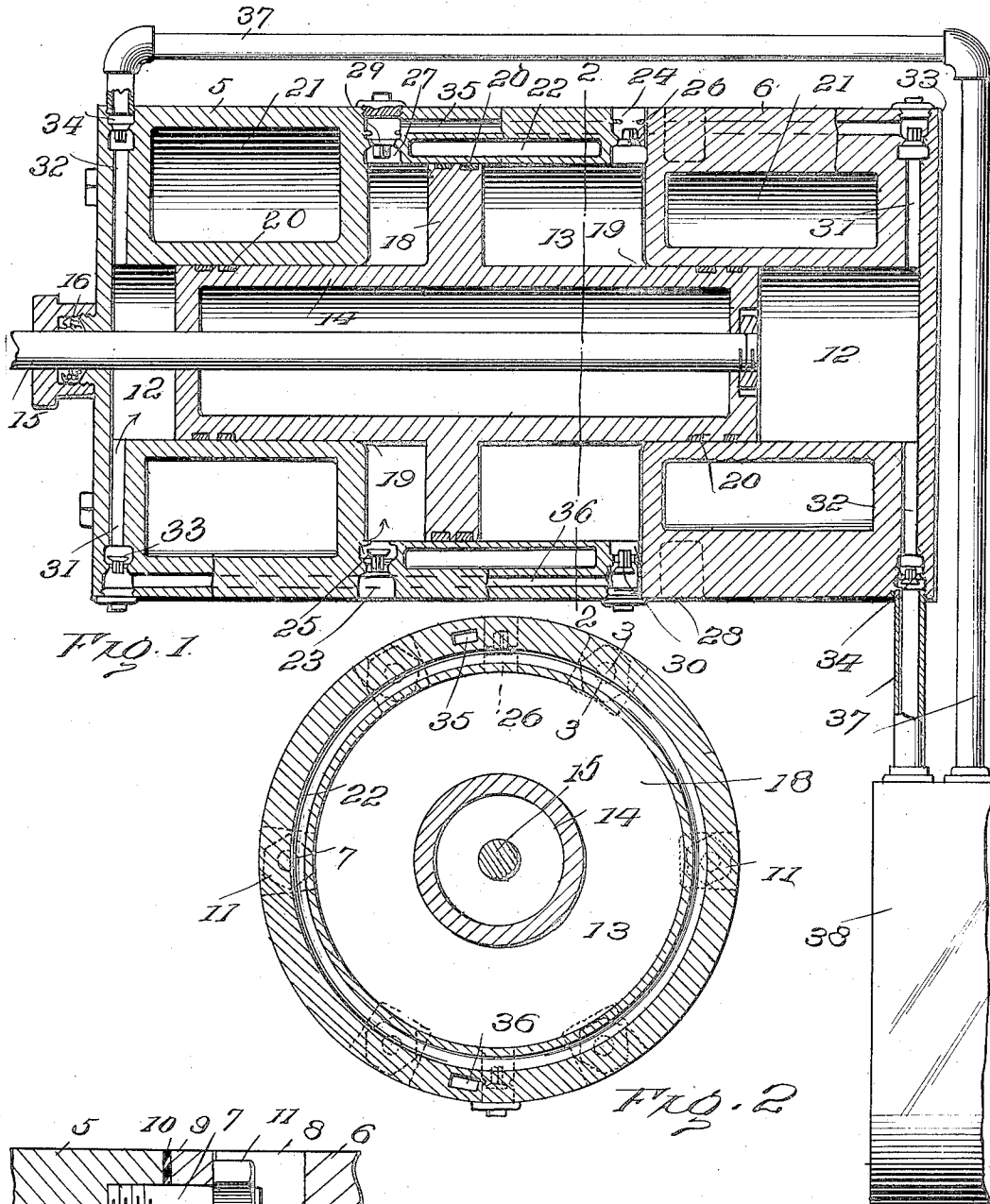


E. MURPHY,
AIR COMPRESSOR.
APPLICATION FILED JULY 11, 1910.

1,057,575.

Patented Apr. 1, 1913.



Inventor

E. Murphy

Witnesses

W. H. H. H.

James M. Fallon,

FIG. 3.

By

H. A. H. H., Attorneys.

UNITED STATES PATENT OFFICE

EDWARD MURPHY, OF ENNIS, TEXAS.

AIR-COMPRESSOR.

1,057,575.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed July 11, 1910. Serial No. 571,426.

To all whom it may concern:

Be it known that I, EDWARD MURPHY, a citizen of the United States, residing at Ennis, in the county of Ellis and State of Texas, have invented certain new and useful Improvements in Air-Compressors, of which the following is a specification.

This invention relates to air compressors and has for its object the provision of a strong, durable and thoroughly efficient device of this character, the construction of which is such as to obtain a maximum compression of air or fluid with a minimum consumption of fuel.

A further object is to provide an air compressor or pump including a cylinder having high and low pressure chambers, air or other fluid being admitted to the low pressure chamber and conducted through the medium of a suitable bypass to the high pressure chamber at each complete stroke of the piston.

A further object is to provide an air compressor, the cylinder of which is formed of mating sections so that said cylinder sections may be readily detached to permit the removal of the piston when it is desired to effect any necessary repairs thereto.

A further object is to prevent leakage and undue friction between the parts, thus materially increasing the efficiency of the pump.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claim.

For a full understanding of the invention and the merits thereof, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a longitudinal sectional view of an air compressor constructed in accordance with my invention; Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1; Fig. 3 is a detail sectional view, showing the manner of connecting the sections comprising the pump cylinder.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The improved air compressor forming the subject matter of the present invention comprises a cylinder preferably formed of mating sections 5 and 6, said sections being of

different lengths and detachably connected by bolts or similar fastening devices 7. The front cylinder section 6 is provided with spaced pockets 8 and a flat face flange 9 adapted to bear against the adjacent end of the mating cylinder section 5, there being a gasket 10 interposed between the section 5 and face 9 to prevent leakage of air or other fluid. The outer ends of the bolts 7 project within the pockets 8 for engagement with clamping nuts 11, the latter being housed within the pockets so as to present a smooth surface at the junction of the cylinder sections. The cylinder is provided with a high pressure chamber 12 and a low pressure chamber 13, the low pressure chamber 13 being formed in the section 5 and the high pressure chamber 12 being formed in both cylinder sections.

Slidably mounted for reciprocation in the high pressure chamber 12, is a piston 14, the rod 15 of which extends through a stuffing box or gland 16 on the rear cylinder head 17 for connection with an engine or other suitable source of power. The piston 14 is provided with a circumferential fin or flange 18, which latter operates within the low pressure chamber 13 and serves to compress the air therein prior to its delivery to the high pressure chamber.

The walls of the cylinder sections at the low pressure chamber 13 are curved or rounded at 19 so as to facilitate the introduction and removal of the piston when the cylinder section 6 is detached from the mating section.

The exterior wall of the body of the piston 14, as well as the circumferential edge of the flange or fin 18, are formed with annular grooves in which are seated suitable packing strips 20, which latter bear against the adjacent walls of the high and low pressure chambers and serve to prevent leakage during the operation of the piston.

It will here be noted that by removing the clamping nuts 11, the front cylinder head 6 may be readily detached from the mating section 5 when it is desired to remove the piston in order to effect any necessary repairs thereto.

The cylinder sections 5 and 6 are preferably formed with circumferential water jackets 21 for the purpose of cooling the air or other fluid during its passage from the low to the high pressure chambers. The cylinder section 5 is preferably formed with

an auxiliary water jacket 22 which surrounds the low pressure chamber 13, the several water jackets being connected through the medium of a pipe or pipes with a suitable source of water supply.

The low pressure chamber is provided with oppositely disposed inlet ports 23 and 24, in which are mounted suitable check valves 25 and 26, said valves opening inwardly, as shown. The low pressure chamber is also provided with exhaust ports 27 and 28 having outwardly opening check valves 29 and 30 arranged therein, the valve 29 serving to control the passage of air or other fluid from the low pressure chamber on one side of the flange 18 to the forward end of the high pressure chamber and the other valve 30 serving to control the passage of air from the low pressure chamber on the other side of the flange 18 to the rear end of the high pressure chamber. The high pressure chamber is provided with inlet and discharge ports 31 and 32 controlled by suitable check valves 33 and 34, the check valves 33 closing outwardly, and the check valves 34 opening outwardly. A by-pass 35 forms a source of communication between the exhaust port 27 of the low pressure chamber and the inlet port 31 of the high pressure chamber at the front of the cylinder, while a similar by-pass 36 forms a source of communication between the exhaust port 28 of the low pressure chamber and the inlet port 31 of the high pressure chamber at the rear end of the cylinder.

Connected with the exhaust ports 32 of the high pressure chamber, are pipes or conductors 37 through which the compressed air passes into a storage tank or reservoir 38 of any suitable construction.

The operation of the compressor is as follows: On the forward stroke of the piston, the valve 25 is moved to open position and air is admitted through the port 23 to the low pressure chamber on one side of the flange 18. At the commencement of the return stroke, the valve 25 is closed and the valve 29 is moved to open position, thus causing the piston to force the air in the low pressure chamber outwardly through the exhaust port 27 and by-pass 35 into the high pressure chamber 12 at the front of the cylinder. At the same time or at the beginning of the return stroke, air enters the low pressure chamber through the port 24 and valve 26 into the low pressure chamber on the opposite side of the flange of the piston, thus completing the first stroke of the latter. At the commencement of the second stroke of the piston, the valve 33 is closed and the valve 25 moved to open position,

thus allowing the air to enter the low pressure chamber. As the piston travels forward, the valve 26 is closed and the valve 30 moved to open position, thus causing the piston to force the air in the low pressure chamber through the by-pass 36 into the high pressure chamber at the rear of the cylinder, the air in the high pressure chamber at the front of the cylinder being compressed and forced through the medium of the conductor 37 into the receiving tank of the conductor 38. On the return stroke of the piston, the air in the high pressure chamber at the rear of the cylinder is compressed and forced through the conductor 37 into the reservoir, as will be readily understood, this operation of the pump being continuous.

Having thus described the invention, what is claimed as new is:

A compressor comprising a cylinder consisting of aligned sections secured directly together, one section having an open end and the other section constituting a closure for said end, the space thus defined forming a low pressure chamber, the said closure section having a central high pressure chamber and the first-mentioned section having a high pressure chamber at the opposite end of said low pressure chamber, a cylindrical piston having its ends playing in the high pressure chambers, a central annular fin on the piston playing in the low pressure chamber, a piston rod extending from the piston through the end of one cylinder section, inwardly opening check valves disposed radially in the wall of the cylinder at both ends of the low pressure chamber and in constant communication with the atmosphere, outwardly opening check valves mounted radially in the wall of the cylinder at both ends of the low pressure chamber, inlet and outlet valves mounted in the wall of the cylinder at the outer ends of both high pressure chambers, a by-pass in the wall of the cylinder leading longitudinally therethrough from the outlet valve at the rear end of the low pressure chamber to the inlet valve of the forward high pressure chamber, and a by-pass in the wall of the cylinder leading longitudinally therethrough from the outlet valve at the forward end of the low pressure chamber to the inlet valve of the rear high pressure chamber.

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

EDWARD MURPHY. [L.S.]

Witnesses:

M. S. T. SHEGOG,
T. B. GOODWIN.