

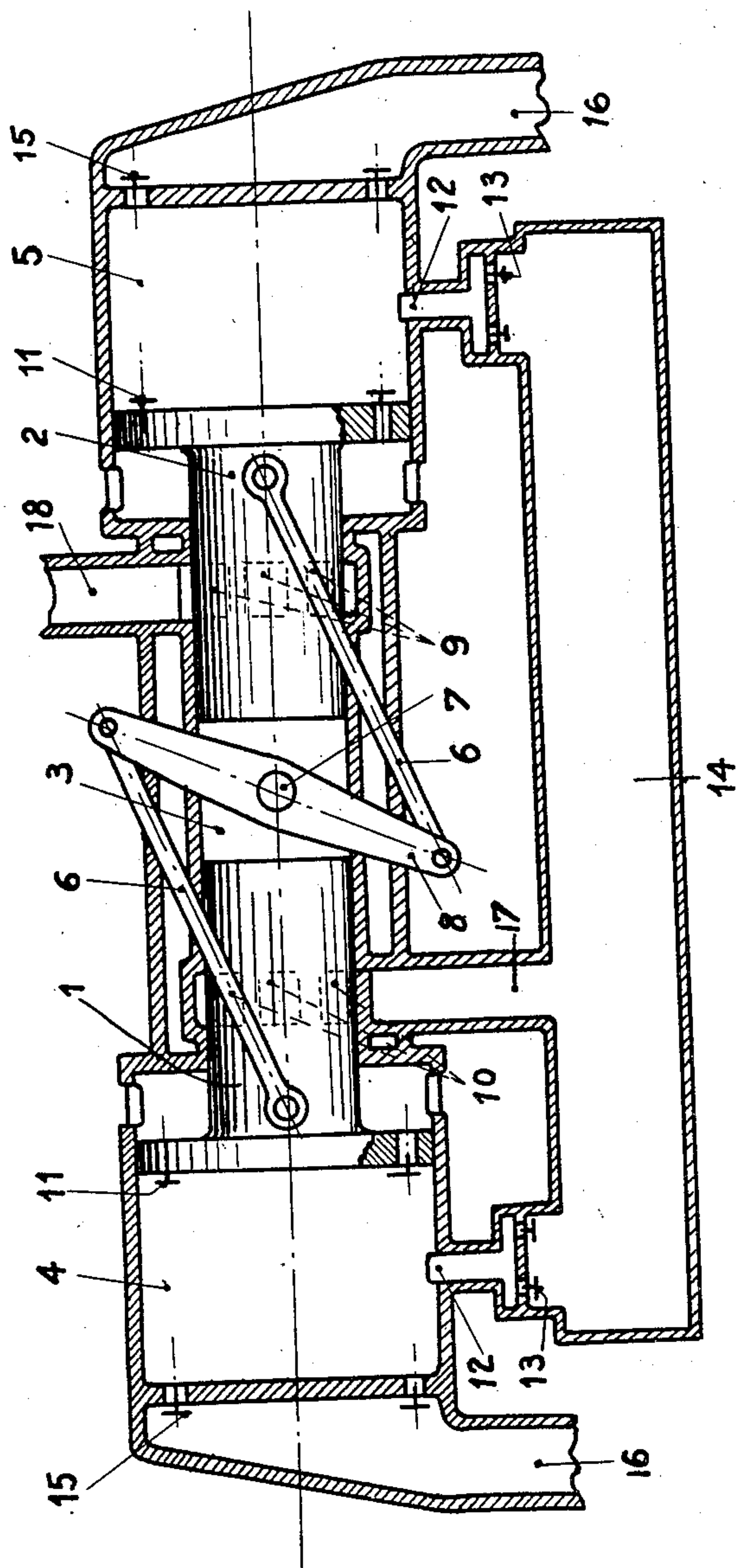
Feb. 14, 1933.

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1,897,674

DIRECT ACTING INTERNAL COMBUSTION AIR COMPRESSOR

Filed Aug. 18, 1930



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UNITED STATES PATENT OFFICE

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DIRECT ACTING INTERNAL COMBUSTION AIR COMPRESSOR

Application filed August 18, 1930, Serial No. 476,110, and in Germany August 17, 1929.

The invention is relative to a scavenging process for two-stroke motor-compressors of the type having interconnected but otherwise free pistons movable in opposite directions.

The principal object of my invention is to simplify the construction of the machines of the type indicated by eliminating some of the accessory elements which serve to compress the scavenging air.

According to the the invention the first part only of each working stroke in the actual compressor cylinder or cylinders is utilized for the compression of the air intended for scavenging, which scavenging air is compressed into a reservoir for the purpose. The scavenging air passes through openings disposed in the walls of the cylinders into a tank or reservoir, which openings are disposed in such wise that they are covered by the compressor pistons as soon as the quantity of air necessary for scavenging is compressed into the tank.

The invention consists in addition of certain other structures hereinafter pointed out.

The invention likewise includes all embodiments thereof and in general all machines corresponding to the said structures as well as their special elements necessitated thereby.

In the accompanying drawing the single figure is a lengthwise section through a motor compressor of the two-cycle type having interconnected but otherwise free pistons movable in opposite directions and direct acting.

Referring to the drawing more in detail, the motor includes two free pistons 1 and 2, movable in a motor cylinder 3 and in the compressor cylinders 4 and 5 in opposite directions. The two pistons are connected together by means of a synchronizing device consisting of links 6 connected to an oscillating lever 8 adapted to describe an angle of less than 180° about a shaft 7. The piston 2 controls at one of the extremities of the motor cylinder the exhaust ports 9 and the piston 1 at the other extremity controls the admission ports 10.

The free pistons 1 and 2 carry on the compressor side the admission valves 11 and they push back the air compressed in the compressor cylinders 4 and 5 which leaves by the

orifices 12 through the check valves 13 and passes into the scavenging air tank 14 and leaves by the check valves 15 to the compressed air tank through conduit 16. The cushions of residual compressed air which remain in the two compressor cylinders 4 and 5 send the pistons back to their inner dead point. Scavenging takes place through scavenging orifices 10 which are opened to allow the scavenging air to flow from tank 14 into the motor cylinder 3 through the conduit 17 and fills the said cylinder with fresh air, which blows the burned gases out through the exhaust orifices 9 into the exhaust pipe 18.

The operation of the above described device is as follows:—

By separating from their internal dead point as illustrated in the drawing, the pistons 1 and 2 determine a pressure in the compressed air tank 14 which is contiguous with the cylinder. The pistons 1 and 2 compress by separating from each other, and consequently during the power stroke, the air in the compressor cylinders 4 and 5 is compressed and during the first part of the said stroke, part of the contents of the compressor cylinder is forced through the ports 12 and the check valves 13 into the tank 14. The openings 12 are disposed in such a way that when the pistons 1 and 2 cover them the pressure in the tank 14 is that necessary for scavenging. The check valves 13 oppose the return of the air into the cylinder through conduit 12, said air remains therefore under pressure until the free piston 1 will have uncovered the opening 10, the scavenging air then escapes through the pipe 17 and the motor cylinder 3 and the pressure drops in the tank 14 until the free piston covers the scavenging orifices anew. After passing the ports 12 during the power stroke, the compressed air is forced through the valve 15 to the conduits 16 to the reservoir for the compressed air.

What I claim and desire to secure by Letters Patent of the United States of America is:—

1. In a motor compressor of the type described, a plurality of compressing cylinders, a common motor cylinder coaxially disposed

with respect thereto, a piston in each of said compressing cylinders, a second driving piston integral with each of said first-mentioned pistons and extending into said common motor cylinder, the compressing cylinders having outlets for compressed air at the ends thereof remote from the motor cylinder, and other outlets for compressed air in positions intermediate the ends thereof, a reservoir in connection with said other outlets, the motor cylinder having inlets towards one end thereof and exhaust openings towards the other end, a conduit connecting said inlets with said reservoir, the communication through the said conduit and inlets between the reservoir and the interior of the motor cylinder being maintained closed by one of the pistons in the motor cylinder until it attains the position towards the end of the power stroke, the exhaust openings being maintained closed by the other piston in the motor cylinder until it attains the position towards the end of the power stroke, for the purposes set forth.

2. A motor compressor as claimed in claim 1 in which the said other outlets for compressed air from the compressing cylinders to the scavenging air receiver are furnished with check valves.

3. In a motor compressor of the type described, a plurality of compressing cylinders, a common motor cylinder coaxially disposed with respect thereto, a piston in each of said compressing cylinders, a second driving piston integral with each of said first-mentioned pistons and extending into said common motor cylinder, the compressing cylinders having outlets for compressed air at the ends thereof remote from the motor cylinder, and other outlets for compressed air in positions intermediate the ends thereof, a reservoir in connection with said other outlets, inlets in the motor cylinder towards one end thereof and exhaust openings towards the other end, and a conduit connecting said inlets with said reservoir, the communication through the said conduit and inlets between the reservoir and the interior of the motor cylinder being maintained closed by one of the pistons in the motor cylinder until it attains the position towards the end of the power stroke, the exhaust openings being maintained closed by the other piston in the motor cylinder until said other piston also attains a position towards the end of the power stroke, the arrangement being such that the air from the compressing cylinders at the first part of the power stroke is driven through the intermediate outlets into the reservoir, after which the said intermediate outlets are closed by the further movement of the pistons, the compressed air from the reservoir passing therefrom into the motor cylinder to effect the scavenging of said cylinder when the pistons approach the ends of the power stroke, one of the said pistons uncovering the exhaust ports

and the other establishing the communication between the reservoir and the interior of the motor cylinder, substantially as set forth.

In witness whereof I affix my signature. 70
RAUL PATERAS PESCARA.

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