March 4, 1930. G. GUNDERSON 1,748,979

AIR COMPRESSOR

Filed Nov. 22, 1928 2 Sheets-Sheet 1

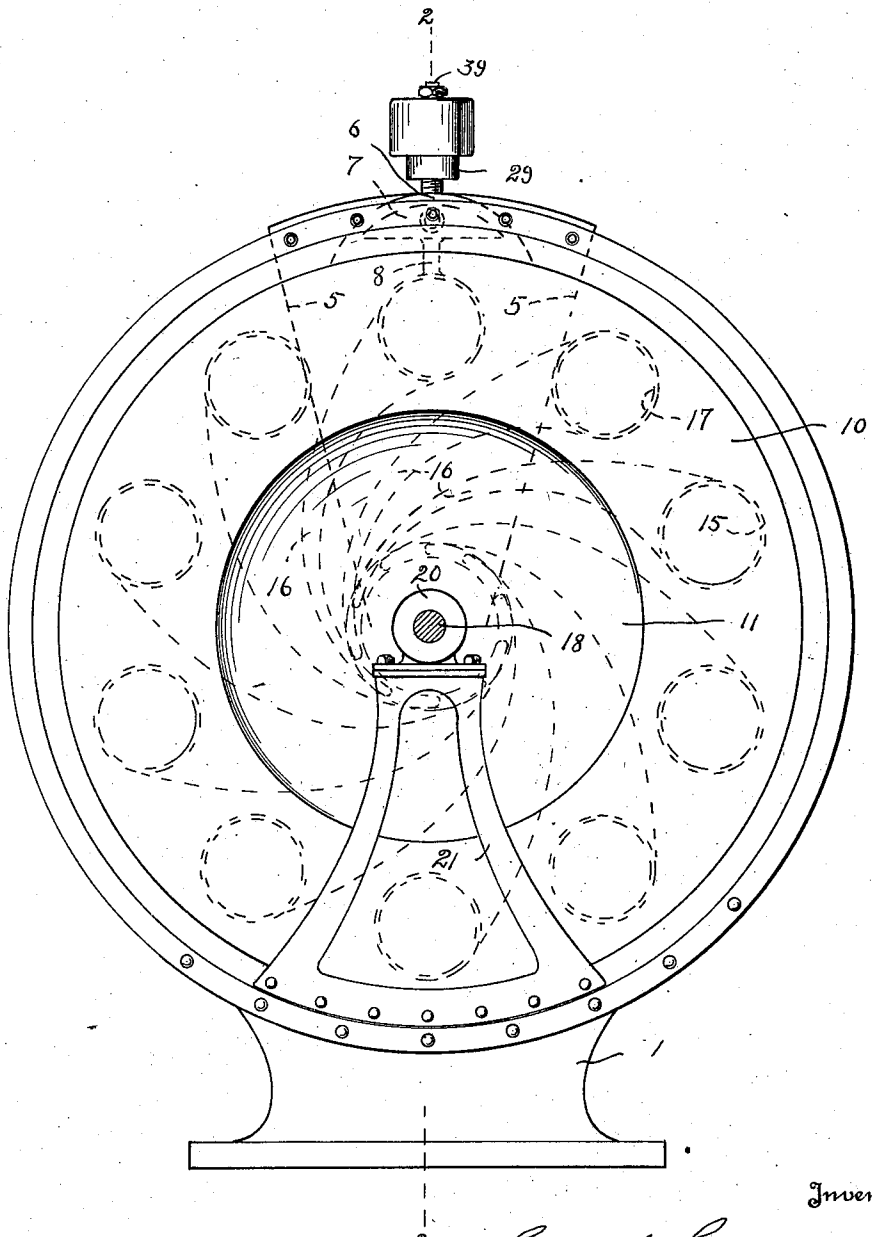


Fig. 1.

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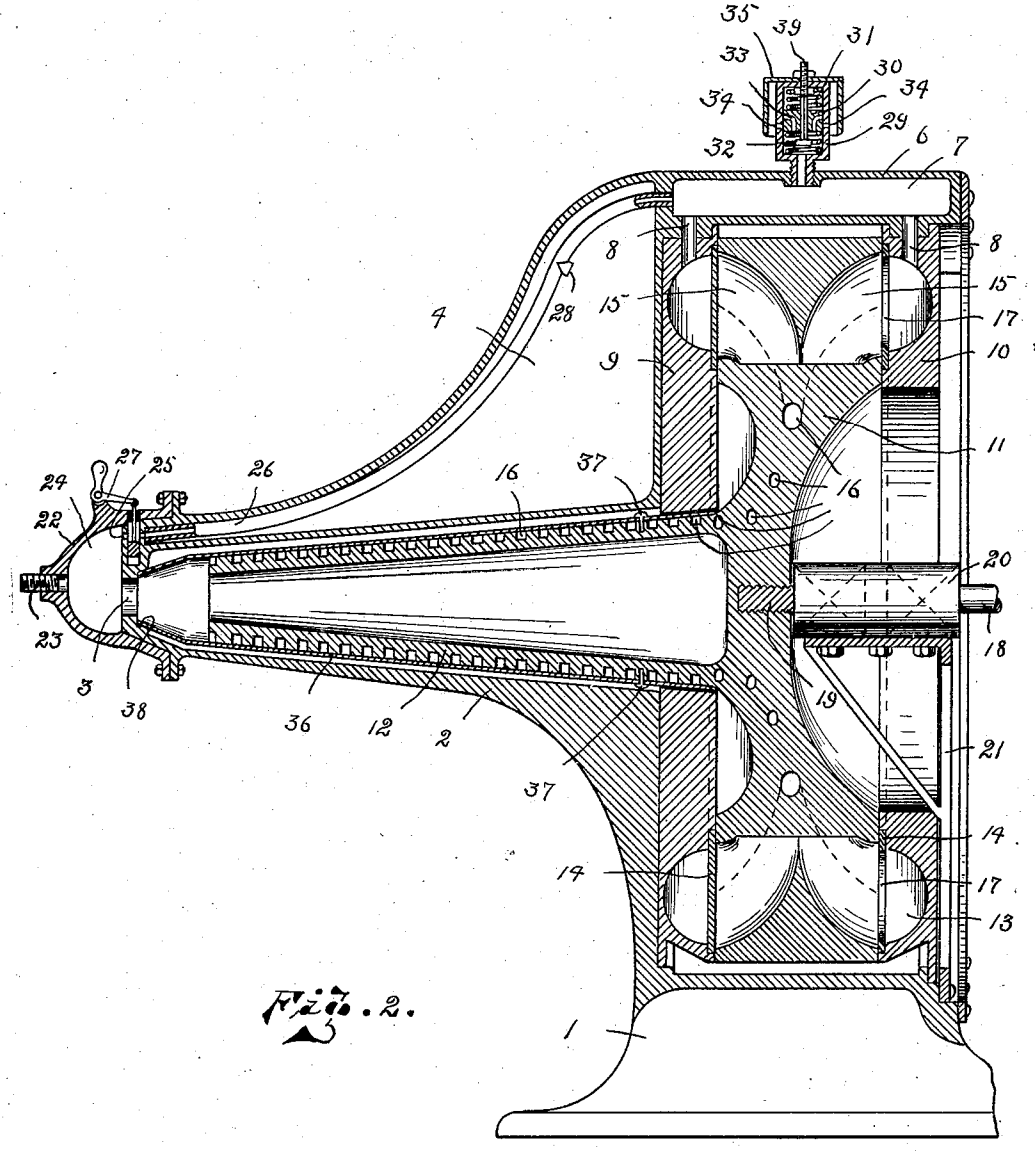


Fig. 2.

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UNITED STATES PATENT OFFICE

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AIR COMPRESSOR

Application filed November 22, 1928. Serial No. 321,172.

This invention relates to air compressors and has for its principal object to produce a simple form of such device which may be depended upon to produce a continuous air pressure while in motion.

Another object is to produce such a device having storage capacity for air compressed thereby when not otherwise utilized, the use of such storage capacity occurring automatically.

Other objects and advantages of the invention will appear in the further description thereof.

Referring now to the accompanying drawing, forming part of the application, and wherein like reference characters indicate like parts:

Figure 1 is a front elevation of the compressor embodying my invention, and

Figure 2 is a central vertical section taken on the line 2—2 of Figure 1.

1 represents the base of a circular upright structure formed integral with one side thereof and which includes the back wall of the housing for the compressor runner or rotor. Axially of this wall there extends rearwardly the tapered or conically shaped extension 2 of the housing, it being hollow and terminating in the tapered nozzle or discharge opening 3, while upon the upper side thereof is formed integrally therewith a reservoir or chamber 4, it being narrower adjacent the conically shaped portion 2, and wider as it extends upwardly, the side walls being indicated at 5 in Figure 1 of the drawings.

A semi-circularly shaped hollow extension 6 is formed integral with the uppermost portion of the back wall and reservoir which forms an inlet chamber 7 for the compressor, there being two depending pipes or passageways 8 leading one from each end of the inlet chamber.

Circular disc-like members which contain the inlet chambers for the rotor are installed within the housing, the one indicated at 9 against the face of the upright wall just described, and the other indicated at 10 intermediate of the outermost portion of the extension 6 and the outermost edge of the base portion 1, and to which portions it may be securely attached in any desired manner, thus forming a space intermediate of the intake chamber disc for the head 11 of the rotor. The body portion of the rotor is indicated at 12, it being of conical shape and fitting loosely within the core of the conically shaped extension 2 of the housing previously described. Circumferentially about the tapered body portion 12 are formed the spirally shaped air passageways 16 which will be described later. About the body portion 12 is a thin metal casing 36 as a closure for said air passgeways, the csing being fixed to the body portion as by suitable set screws 37, the outer end of the casing extending beyond the end of the body portion and preferably fitted within the stepped recess 38 about the discharge opening 3. This bearing does not necessarily act as a support for the outer end of the casing, but simply as a guide and suitable discharge connection between the casing and outer end of the extension 2.

A circular chamber 13 is formed in each intake chamber disc, said chambers being semi-circular in cross section as clearly shown in Figure 2 of the drawings, they each extending wholly about their respective discs and communicating with their respective intake chambers 8.

Intermediate of each face of the rotor head 11 and its respective intake disc and recessed within each intake disc is installed a port ring 14, the ports 17 in said rings being circular openings somewhat smaller in diameter than the width of the semi-circularly shaped intake chambers and communicating with same, however being peculiar in this respect that the ports as viewed from the front of the compressor are alternate or staggered, that is to say not opposite, so that the ingress of air to the head of the compressor occurs alternately from either side thereof.

The head and hub of the rotor are of a unitary piece of metal as clearly illustrated, and circumferentially about either vertical face thereof and adjacent the peripheral edge are formed arcuately shaped ports 15, in pairs, one facing the outermost intake disc and the other the rearmost intake disc, but, as before described, one will be communi-

cating with said intake port when the other will be closed to said opposite port. However each pair of intake ports 15 of the rotor head form the mouth of a helically shaped port or passageway indicated at 16 through the head of the rotor and emerging from the interior of the head of the rotor just inwardly of the intake disc 9 as indicated upon opposite sides thereof and beneath the thin metal casing 36, and continuing spirally about the circumferential surface of the conically shaped hub of the rotor.

The rotor is driven in any desired manner by the shaft 18 which is preferably screw threadedly mounted therein as at 19 and carried upon suitable ball or other forms of bearings indicated at 20, supported upon the bracket 21, which is also mounted upon the base 1 of the compressor unit.

The discharge orifice 3 of the hub 2 enters the hollow cap 22 which is tapped as at 23 and connected to any suitable take-off where the compressed air is utilized. From the chamber 24 within the cap 22 a passageway leads as at 25 to the tube 26 within the reservoir 4, this tube leading directly to the chamber 7 in the intake extension 6, and the port 25 is governed as for example by the valve operating bell-crank 27 so that when the compressor is generating an abnormal current and the air returned to the rotor head by means of the passageway just described, a branch take-off 28 will permit of the reservoir being automatically filled or maintaining a uniform pressure with that of the return pipe 26. Air under pressure may be tapped from the reservoir 4 in any desired manner when expedient.

The intake air supply to the extension 6 is controlled by a suitable piston valve, the housing of which is indicated at 29, the valve at 30, the expansive spiral spring 31 above the valve and a like spring 32 below the valve, there being ports 34 through the housing so that when sufficient suction occurs the piston will be drawn downwardly and air admitted through the angle ports 33 in the piston and 34 in the sides of the housing; and a suitable cap or hood-like cover 35 is provided for the valve, which latter is preferably mounted upon a squared fixed stem 39 depending within the valve housing.

As is obvious the power generated by the rotor operated in a clockwise direction as viewed by the front thereof is centripetal, and due to the tapered or cornucopia like form of the intake ports of the rotor, a high speed thereof will produce remarkably efficient results, and these ports being spiral in form throughout tend to drive the air forcibly axially of the compressor, and the intake ports being staggered and opposite, a beneficial pulsation of the motor is obvious to those versed in the art.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A centripetal air compressor of the character described including a rotor having an axial extension thereupon, a plurality of helically shaped air passageways in the head of the rotor and extending circumferentially about the axial extension thereof, a double receiving port in the head of the rotor for each passageway, and circular intake ports upon either side of the head of the rotor.

2. A centripetal air compressor of the character described comprising a housing having an air chamber therein, automatic air inlet and exhaust means communicating with said chamber, a rotor having an axial extension thereupon and spiral air passageways formed therein terminating in ports in the rotor head, chambered discs within the housing, said chambers communicating with the air chamber and rotor head ports.

3. An air compressor of the class described including a housing having an air chamber and an air reservoir therein, means for the intake and exhaust of air to said chamber, a rotor having air passageways upon either side thereof communicating with the air chamber, and selective means whereby air compressed by the rotor may or may not be admitted to the air reservoir.

In testimony whereof I affix my signature.

GILBERT GUNDERSON.