COOLING FACILITIES FOR ROTARY COMPRESSORS

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Fig. 1

Fig. 2

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This invention relates to improvements in the cooling devices of rotary compressors.

Rotary compressors, in which the stationary parts are cooled, including the casing and end covers, and the rotary parts are cooled, comprising the rotor or piston and the shaft, operate at their greatest efficiency when there is the least amount of play possible between the housing and the rotor.

With the foregoing in mind it is the object of my invention to render the play between the parts independent of the varying working conditions of the compressor in order that the play may always be maintained at a minimum. I accomplish this object by providing means for separately varying the degree of cooling of the housing and of the shaft.

One embodiment of the invention is illustratively exemplified in the accompanying drawing, in which Figure 1 is a substantially longitudinal sectional view of a compressor equipped with the cooling means according to the invention; and Figure 2 is a longitudinal sectional view of a valve for controlling the flow of water to the rotor shaft.

Referring to the drawing, 1 denotes the rotary compressor comprising a cylindrical housing and end plates 1a therefor. The housing forms a water jacket having an annular water compartment 1b and the end plates 1a are provided with bearings in which a tubular shaft 1c of the rotor R is supported. One end of the shaft 1c is closed by a plug and provided with a pulley 1d beyond the adjacent bearing. The other end of the shaft 1c is open and receives a length of pipe 1e which is smaller in diameter than the bore of the shaft, and which projects into and axially of the latter to a point short of the plugged end thereof. A manifold housing 1f is carried by the bearing of the compressor housing 1 and is adapted to form a chamber over the open end of the shaft 1c to receive water being introduced into the shaft from the end of the pipe 1e and to lead it off through an outlet pipe 1g into a waste pipe 1h. The water jacket 1i is supplied with water through a pipe 1j having a regulating valve 1k in the line to control the volume of water allowed to flow into the housing, the latter being provided with an outlet pipe 1l leading to a waste pipe 1m. Water is independently supplied to the pipe 1e through a pipe 1n which enters the manifold housing 1a along the axis of the compressor and joins the outer end of the pipe 1c. The pipe 1n is provided with a control valve 1o which receives its supply of water from a pipe 1p.

Figure 2 shows one example of how the valve 1s may be made automatic. Water supplied through a pipe 1q flows into an annular space 1r and thence through ports 1s in a piston slide valve 1t into a pipe 1u leading to the cooling chambers in the rotor. A chamber 1v above the valve 1s is connected by the pipe 1w with the main pressure conduit supplied by the compressor. When the air pressure in the main rises the valve 1s will be forced downwardly against the action of its spring 1x. An increased area of the ports 1y is opened so that the supply of water is increased, as well as the cooling effect in the compressor. A rise of air temperature in the compressor is the result of an increase of air pressure; but since, as stated above, the cooling effect is proportionately increased the desired end is attained, namely there is no expansion of the rotor.

I claim:

1. An arrangement for providing circulation of a cooling medium in the stationary and moving parts of a rotary compressor, comprising a water jacket housing for a rotor, a hollow shaft for the latter, means for supplying the cooling medium to the housing and hollow shaft, and means operatively connected to the supply means and compressor for automatically varying the quantity of cooling medium supplied by said first named means in accordance with variations in pressure of the air discharged from said compressor to reduce to a minimum the play between rotor and housing at all working conditions.

2. An arrangement, as claimed in claim 1, in which said last means comprises a valve having a casing provided with spaced chambers, one thereof being connected to the air line of the compressor and the other being disposed in the cooling line to the compressor, a slid-
ing core between said chambers and adapted
to open and close the passage through the
chamber in the cooling line, and a spring for
urging the core against the head of air in the
air line.
3. The herein described method of regulat-
ing the circulatory cooling system of a rotary
compressor, which consists in introducing a
cooling medium separately into the station-
ary and rotary parts of the compressor, and
in utilizing the variations in pressure of the
air discharged from the compressor to auto-
matically vary the quantity of the cooling
medium in the rotary parts of the comp-
pressor to reduce to a minimum the play be-
tween rotor and housing at all working con-
ditions.
4. A cooling arrangement for a compres-
sor comprising a water jacket housing for a
rotor, a hollow shaft therefor, means for in-
dependently supplying water to the housing
and shaft, valves controlling the water sup-
ply to the housing and shaft, the valve con-
trolling the water supply to the shaft being
controlled by the pressure of compressed air
produced by the rotor, whereby the flow of
the water passing through said last men-
tioned valve is increased upon increase in
pressure of the air discharged by the com-
pressor and vice versa, to reduce to a mini-
num the play between rotor and housing at
all working conditions.
In testimony whereof I affix my signature.

HANS STEINER.