

机械科学

静止叶片式空气压缩机的研究

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摘要:

提出了一种新型静止叶片式空气压缩机,该压缩机具有一个做摆动运动的转子和一个静止不动的叶片,叶片的外端与气缸的内孔壁面密封固定连接,叶片的侧端与端盖密封固定连接,借此减少了气体直接从压缩腔向吸气腔窜逸的通道,有效地消除了压缩机在这些部件间的泄漏损失和摩擦损耗。介绍了压缩机的结构特点及工作原理,建立了压缩机的数学模型。研究表明:转子的扭摆惯性力矩对滑块与叶片运动副的摩擦及磨损有较大影响,应减小转子的转动惯量以降低滑块与叶片间的接触力;转子与端盖的轴向间隙对压缩机内部泄漏损失十分敏感,应采取轴向密封措施以减少转子轴端处的泄漏量。

关键词:

空气压缩机 静止叶片 泄漏损失 摩擦损耗

Research on Stationary Blade Type of Air Compressor

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Abstract:

This paper proposed a new type of stationary blade air compressor,in which the compressor had a swing rotor and a stationary blade,and the blade's out-end was hermetically fastened to the cylinder's inner wall and the blade's two side-ends were hermetically fastened to the end-covers, so that the gas leaking paths from the compression chamber to the intake chamber were decreased and the leakage and friction occurred from these parts were eliminated effectively.The paper introduced the compressor's structure characteristics and working principles,and established a mathematical model for the compressor.

The results show:the rotor's moment of inertia has severe effects on the friction and the wear in the sliding block-blade moving pairs.Thus it should be minimized in order to decrease the contact force between the sliding blocks and the blade.The axial clearances between the rotor and the covers affect the compressor's internal leaking loss sensitively,therefore the axial seals should be adopted in order to reduce the leakage at rotor's two axial ends.

Keywords: air compressor;stationary blade;leaking loss;friction wastezz" href="#"> air compressor;stationary blade;leaking loss;friction waste

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