

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* DANFOSS COMPRESSORS GmbH

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Appeal 2008-0217  
Application 10/448,602  
Technology Center 3700

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Decided: 21 February 2008

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Before JAMESON LEE, RICHARD TORCZON, and JENNIFER D.  
BAHR *Administrative Patent Judges*.

TORCZON, *Administrative Patent Judge*.

DECISION ON APPEAL

The claims on appeal relate to a piston compressor having a piston's outer jacket with a circumferential lubrication groove and a piston pin having a longitudinal bore.<sup>1</sup> The examiner has rejected Claims 1-5, 7, 8, and

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<sup>1</sup> Specification (Spec.) at 1:0002.

10 under 35 U.S.C. § 103 as being unpatentable based on obviousness.

Danfoss seeks review of the rejection. We AFFIRM.

### THE CLAIMED INVENTION

Claims 1-5, 7, 8 and 10 are the subject of this appeal.<sup>2</sup> Danfoss does not offer separate arguments for the rejected claims. Therefore, the claims stand and fall together. We select the independent Claim 1 as representative of the claims on appeal.<sup>3</sup> Claim 1 defines the invention as follows:

A piston compressor comprising at least one cylinder and a piston reciprocating in said cylinder, the piston being connected with a driving rod via a piston pin and having in its outer jacket surface a circumferential lubrication groove, the piston pin having a longitudinal bore, which is connected with a lubricant source, and wherein in a gravity direction the longitudinal bore is open downward and has a ventilation opening upward.<sup>4</sup>

During examination claims are given their broadest reasonable interpretation consistent with the specification. Claim language should be read in light of the specification as it would be interpreted by a person of ordinary skill in the art.<sup>5</sup> We note that the claim uses the term “comprising” in transit from the preamble to the body of the claim, which means the claim

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<sup>2</sup> Supplemental Examiner’s Answer (Ans.) at 3.

<sup>3</sup> 37 C.F.R. § 41.37(c)(1)(vii).

<sup>4</sup> Appeal Brief (Br.) at 7.

<sup>5</sup> *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004).

is open to inclusion of other elements. Figure 1<sup>6</sup> (below) illustrates an embodiment within the scope of claim 1:

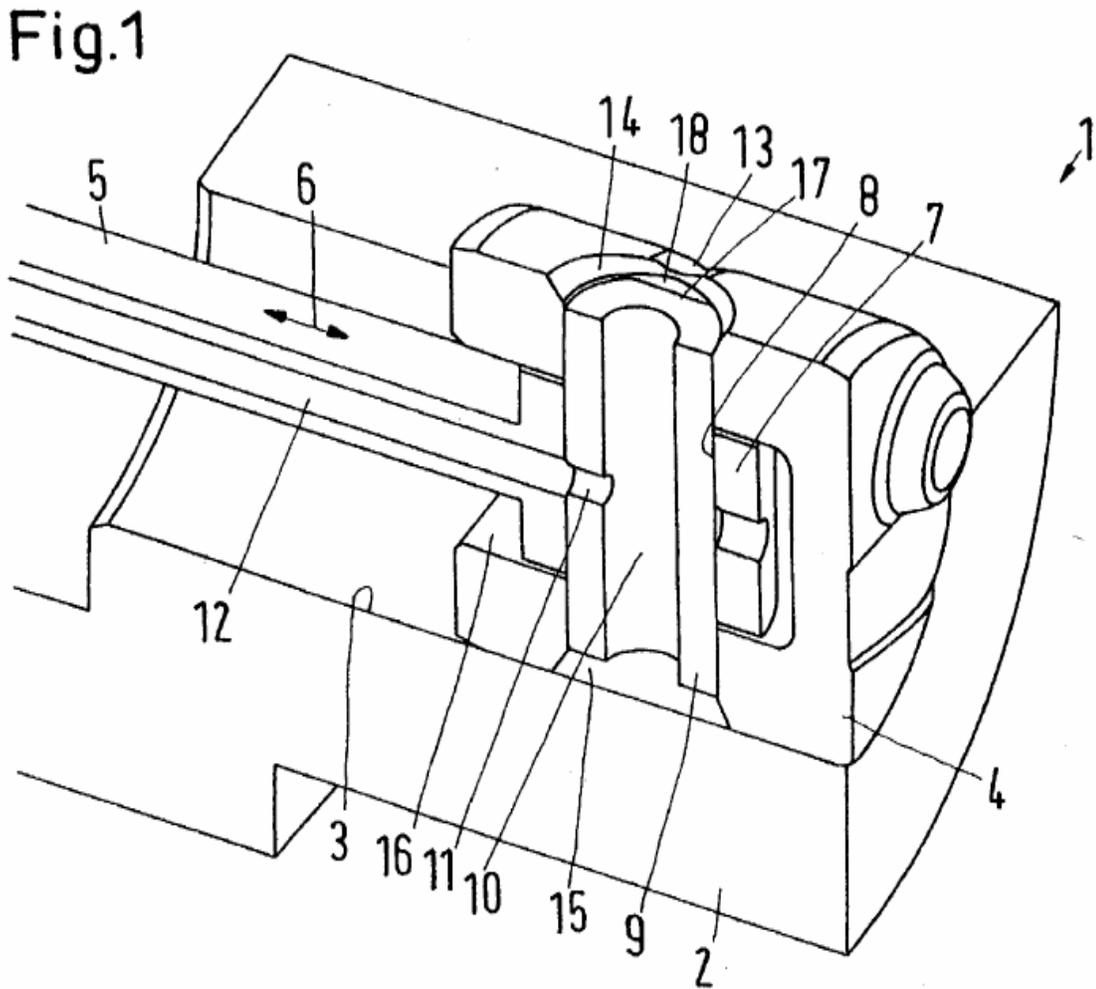


Figure 1 shows a piston 4 with a circumferential lubrication groove 13.

The examiner and Danfoss have different understandings of the scope of the claim. In particular, the examiner construes the groove to read on a

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<sup>6</sup> Spec. Figure 1.

depression between fixed structures on the outer surface of the piston.<sup>7</sup> The specification contains detailed information on the invention but no special definition for the phrase "a circumferential lubrication groove in its outer jacket surface." The examiner's construction is reasonable in view of the specification.

### OBVIOUSNESS

The claims have been rejected as including subject matter that would have been obvious to a person having ordinary skill in the art in view of two United States patents to Melchior<sup>8</sup> and Goodnight,<sup>9</sup> respectively.<sup>10</sup> In analyzing obviousness, the scope and content of the prior art must be determined, the difference between the prior art and the claim ascertained, and the ordinary level of skill in the art resolved.<sup>11</sup>

#### *Scope and content of the prior art*

The Melchior patent relates to pistons for reciprocating machines. This piston **1** has two circumferential continuous rings **3** between which a

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<sup>7</sup> Ans. at 5.

<sup>8</sup> J.F. Melchior, *Anti-Seizing Design for Circumferentially Continuous Piston Ring*, US 4,794,848 (issued 3 January 1989).

<sup>9</sup> T.E. Goodnight, *Viscous Pumping System*, US 6,457,561 B1 (issued 1 October 2002).

<sup>10</sup> Ans. at 3.

<sup>11</sup> *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). The record on appeal does not contain objective evidence of secondary considerations.

passageway **6a** opens onto the outer surface of the piston.<sup>12</sup> Melchior discloses an anti-seizing piston design with a continuous circumferential ring rather than a split ring.<sup>13</sup> Melchior's Figure 3 is reproduced below:<sup>14</sup>

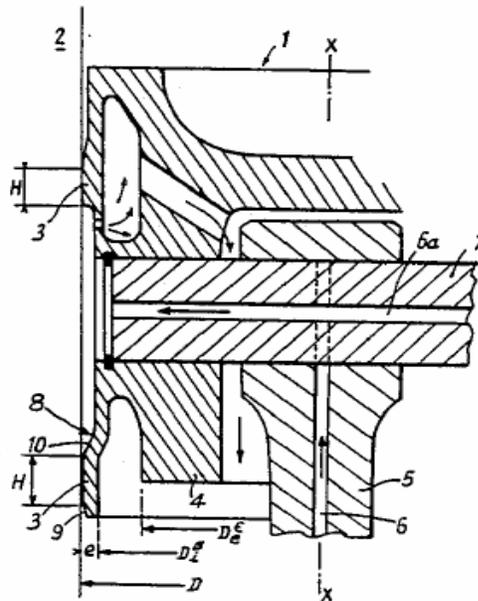


Figure 3 depicts a piston with two circumferential continuous rings **H**. The piston has a connecting rod **5** and passageway **6** for supplying lubricating oil coming from an oil sump. The passageway **6** extending longitudinally along the connecting rod **5** and a passageway **6a** extending axially along a pin **7** of the connecting rod.

The examiner cites Goodnight to address the lubrication path orientation.<sup>15</sup> Goodnight's Figure 1 is shown below:<sup>16</sup>

<sup>12</sup> Melchior at 11:36-39.

<sup>13</sup> Melchior at 1:2-4.

<sup>14</sup> Melchior, Fig. 3.

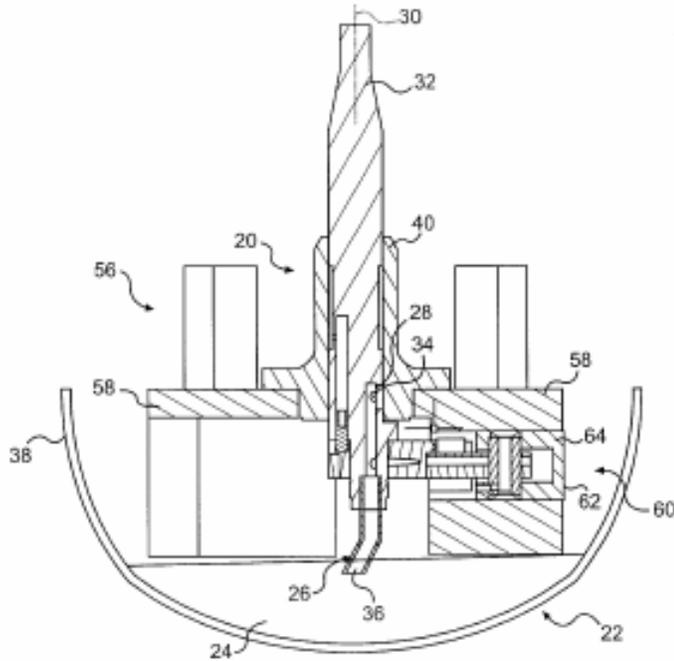


Figure 1 depicts a viscous pumping system for lubricating a bearing.

*Difference between the prior art and the claims*

Danfoss argues that the limitation “the piston .... having in its outer jacket surface a circumferential lubricating groove,” is not shown by the piston of Melchior.<sup>17</sup> Danfoss’ Figure 2 is shown below:<sup>18</sup>

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<sup>15</sup> Ans. at 3:9.

<sup>16</sup> Goodnight, Fig. 1.

<sup>17</sup> Br. at 2.

<sup>18</sup> Danfoss’ Fig. 2, as labeled in Ans. at 6.



portions **H** fixed to the piston and the depression between the sections forms a depression **C** shown in Figure 3 below:<sup>20</sup>

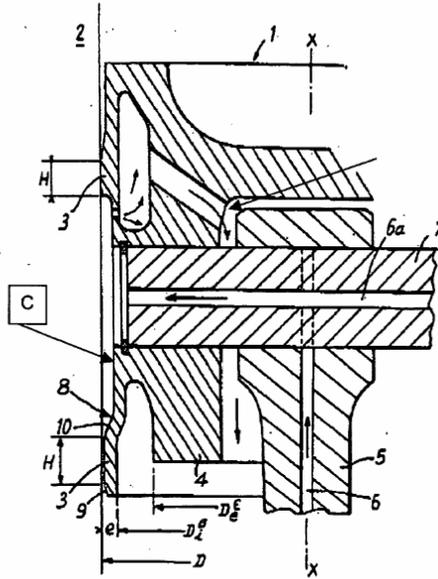


Figure 3 depicts the Melchior piston inside a cylinder.

*The ordinary level of skill*

We look to the evidence of record, the applicant's disclosure, the cited references, and any declaration testimony in resolving level of skill in the art.

Danfoss' specification discusses earlier prior art from which a skilled person would have appreciated that lubrication oil flows from the crankshaft through the connecting rod to the piston pin. A longitudinal bore in the piston pin delivers lubricating oil that is pressed upward and reaches the lubrication groove. The groove is in an area between the piston and the

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<sup>20</sup> Melchior's Fig. 3, as labeled in Ans. at 6.

cylinder wall. This oil supports lubrication of the working surfaces of the cylinder and the piston and the sealing between cylinder and piston.<sup>21</sup>

### ANALYSIS

We concluded above that the examiner's construction of the groove limitation to read on a depression between fixed structures on the piston is reasonable. The examiner states that the depression between the fixed rings in Melchior is a groove in the outer surface.<sup>22</sup> Danfoss argues that the piston of Melchior carries two rings, and these rings are not part of the outer surface of a piston.

Claim 1 is broader than Danfoss' arguments. The obligation to draft a claim covering the invention lies with the applicant.<sup>23</sup> Danfoss cites no evidence that the area between the solid circumferential rings of Melchoir's piston would not be considered a groove in its outer surface to one of ordinary skilled in the piston art. Arguments of counsel cannot take the place of evidence lacking in the record.<sup>24</sup> When properly construed, the contested limitation in claim 1 reads on the depression between Melchoir's rings.

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<sup>21</sup> Spec. at 1:0003- 2:0004.

<sup>22</sup> Ans. at 5.

<sup>23</sup> *In re Morris*, 127 F.3d 1048, 1057 (Fed. Cir. 1997).

<sup>24</sup> *Estee Lauder Inc. v. L'Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997).

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### CONCLUSION

Danfoss has not demonstrated prejudicial error in the rejection of claim 1 when it is construed as broadly as is reasonable in view of the specification. Since the claims stand or fall together, the rejection of all pending claims under § 103 is —

AFFIRMED

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