that, even with oscillation movement of the piston 1, the restrictors 16, 17, 18, 19 will never be uncovered, that is, the piston 1 will not come out of the actuation area of the restrictor 16, 17, 18, 19.

Figure 2 presents information relating to the expressions existing inside the cylinder/piston 1 assembly. The instant of figure 2 corresponds to a gas compression movement effected by the piston 1. At this instant there is a gas discharge pressure that is much higher than the pressure existing in the opposite region of the piston 1.

For a better understanding of the phenomena that entail the decrease in efficiency of the compressor, the region between the piston 1 top and the cylinder head 3 will be called high-pressure region. The piston cylinder head 3 will be called low-pressure region.

In turn, when the piston 1 top is at the point closest to the cylinder head 3, this is called top dead center (TDE/PMS) and when the piston 1 top is at the point farthest from the cylinder head 3 this is called (LDE/PMI). Thus, the piston 1 travels a linear movement between the top dead end (TDE/PMS) and the lower dead end (LDE/PIM).

Of course the gas pressure at the moment of compression will be higher in the high-pressure region. This gas flows to the perimeter clearance 12, defined by the difference between the piston diameter (Pd/Dp) and the cylinder diameter (Cd/Dc), travelling the whole length of the clearance (Cf) which, in this case, corresponds to the length of the piston 1. For a better definition of the invention, for the purpose of the expressions existing in the perimeter clearance 12, one should understand that the top of the perimeter clearance 12 and the bottom of the perimeter clearance 12 vary throughout the clearance (Cf).

As already demonstrated, the size of the clearances between piston 1 and cylinder 2 entails a loss of efficiency of the compressor in a considerably high relationship. In order to assess the better solution, one should detect which of the factors leakage and irreversibility has more influence on the loss of efficiency. For this purpose, we use theoretical models.

Anyway, before the explanation on the result of the simulation, it

CLAIMS

1. A piston/cylinder assembly, the piston (1) being displaceably positioned inside the cylinder (2),

the piston moving between a top dead center (TDC/PMS) and a bottom dead center (BDC/PMI),

between an inner wall of the cylinder (2) and an outer wall of the piston 91) there being a perimeter clearance (12) for aerostatic bearing arrangement (1),

the assembly being characterized in that:

- there is a minimum perimeter clearance (12) at the top portion of the piston (1) when the piston (1) is at its top dead center (TDC/PMS),
- the clearance (12) being always smaller at the top portion of the piston (1) than in any other region of the piston/cylinder assembly.

2. A piston/cylinder assembly according to claim 1, characterized in that the perimeter clearance (12) is variable from the bottom dead center (BDC/PMI) to the top dead center (TDC/PMS).

3. A piston/cylinder assembly according to claims 1 and 2, characterized in that the closer to the top portion of the piston (1) top the perimeter clearance (12) is, the smaller it is.

4. A piston/cylinder assembly according to claims 1 to 3, characterized in that the piston (1) has a variable cross-section.

5. A piston/cylinder assembly according to claims 1 to 4, characterized in that the cylinder (1) has a variable cross-section.

6. A piston/cylinder assembly according to claims 1 to 5, characterized in that the top portion of the piston (1) has a dimension larger than the remaining portion of the piston (1).

7. A piston/cylinder assembly according to claims 1 to 6, characterized in that the top portion of the cylinder (2) has a dimension smaller thant the remaining portion of the cylinder (2).

8. A piston/cylinder assembly according to claims 1 to 7, character-

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ized in that the piston (1) is conical.

9. A piston/cylinder assembly according to claims 1 to 8, characterized in that the piston (1) has a circle-segment shape.

10. A piston/cylinder assembly according to claims 1 to 9, characterized in that the cylinder (2) has frustum-type geometry.

11. A piston/cylinder assembly according to claims 1 to 10, characterized in that the cylinder (2) has a circle-segment shape.

12. A linear compressor characterized by comprising a piston/cylinder assembly as defined in claims 1 to 11.

13. A piston/cylinder assembly for a linear compressor, the piston (1) being displaceably positioned within the cylinder (2),

the piston (1) moving between a high-pressure portion (Pd) and a low-pressure portion (Ps),

the high-pressure (Pd) having higher gas density than the low-pressure portion (Ps),

a perimeter clearance (12) being defined between an inner wall of the cylinder (2) and an outer wall of the piston (1) for aerostatic bearing arrangement (1) with gas,

the assembly being characterized in that:

the dimension of the perimeter clearance (12) varies in an inversely proportional manner with respect to the gas density in the perimeter clearance (12).

14. A piston/cylinder assembly according to claim 1, characterized in that the piston (1) has a variable cross-section.

15. A piston/cylinder assembly according to claims 13 and 14, characterized in that the cylinder (1) has a variable cross-section.

16. A piston/cylinder assembly according to claims 13 to 15, characterized in that the top portion of the piston (1) has a larger dimension than the remaining portion of the piston (1).

17. A piston/cylinder assembly according to claims 13 to 16, characterized in that the top portion of the cylinder (2) has a smaller dimension than the remaining portion of the cylinder (2).

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18. A piston/cylinder assembly according to claims 13 to 18, characterized in that the piston (1) has a circle-segment shape.

19. A piston/cylinder assembly according to claims 13 to 19, characterized in that the cylinder (2) is conical.

20. A piston/cylinder assembly according to claims 11 to 20, characterized in that the cylinder (2) has a circle-segment shape.

21. A linear compressor characterized by comprising a piston/cylinder assembly according to claims 13 to 21.

22. A piston/cylinder assembly, the piston (1) being displaceably positioned within the cylinder (2),

the piston (1) moving between a top dead center (TDC/PMS) and a bottom dead center (BDC/PMI),

between an inner wall of the cylinder (2) and an outer wall of the piston (1) there being a perimeter clearance (12) for aerostatic bearing arrangement of the piston (1),

the assembly being characterized in that:

- the piston/cylinder assembly having varying cross-section defining a perimeter clearance (12) which is minimum when the piston (1) is at its top dead center (TDC/PMS), and
- the closest to the head (3) the piston (1) is, the smaller the perimeter clearance.

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that, even with oscillation movement of the piston 1, the restrictors 16, 17, 18, 19 will never be uncovered, that is, the piston 1 will not come out of the actuation area of the restrictor 16, 17, 18, 19.

Figure 2 presents information relating to the expressions existing inside the cylinder/piston 1 assembly. The instant of figure 2 corresponds to a gas compression movement effected by the piston 1. At this instant there is a gas discharge pressure that is much higher than the pressure existing in the opposite region of the piston 1.

For a better understanding of the phenomena that entail the decrease in efficiency of the compressor, the region between the piston 1 top and the cylinder head 3 will be called compression chamber 4 and there is where the high pressures on the gas take place. The region that is between the piston 1 bottom and the cylinder 2 portion opposite the head 3 is called low-pressure region.

In turn, when the piston 1 top is at the point closest to the cylinder head 3, this is called top dead center (TDE/PMS) and when the piston 1 top is at the point farthest from the cylinder head 3 this is called (LDE/PMI). Thus, the piston 1 travels a linear movement between the top dead end (TDE/PMS) and the lower dead end (LDE/PIM).

Of course the gas pressure at the moment of compression will be higher in the high-pressure region. This gas flows to the perimeter clearance 12, defined by the difference between the piston diameter (Pd/Dp) and the cylinder diameter (Cd/Dc), travelling the whole length of the clearance (Cf) which, in this case, corresponds to the length of the piston 1. For a better definition of the invention, for the purpose of the expressions existing in the perimeter clearance 12, one should understand that the top of the perimeter clearance 12 and the bottom of the perimeter clearance 12 vary throughout the clearance (Cf).

As already demonstrated, the size of the clearances between piston 1 and cylinder 2 entails a loss of efficiency of the compressor in a considerably high relationship. In order to assess the better solution, one should detect which of the factors leakage and irreversibility has more influence on the loss of efficiency. For this purpose, we use theoretical models.

Anyway, before the explanation on the result of the simulation, it

CLAIMS

1. A piston/cylinder assembly, the piston (1) being displaceably positioned inside the cylinder (2),

the piston moving between a top dead center (TDC/PMS) and a bottom dead center (BDC/PMI),

between an inner wall of the cylinder (2) and an outer wall of the piston (1) there being a perimeter clearance (12) for aerostatic bearing arrangement (1),

the assembly being characterized in that:

- there is a minimum perimeter clearance (12) at the top portion of the piston (1) when the piston (1) is at its top dead center (TDC/PMS),
- the clearance (12) being always smaller at the top portion of the piston (1) than in any other region of the piston/cylinder assembly.

2. A piston/cylinder assembly according to claim 1, characterized in that the perimeter clearance (12) is variable from the bottom dead center (BDC/PMI) to the top dead center (TDC/PMS).
3. A piston/cylinder assembly according to claims 1 and 2, characterized in that the closer to the top portion of the piston (1) top the perimeter clearance (12) is, the smaller it is.
4. A piston/cylinder assembly according to claims 1 to 3, characterized in that the piston (1) has a variable cross-section.
5. A piston/cylinder assembly according to claims 1 to 4, characterized in that the cylinder (2) has a variable cross- section.
6. A piston/cylinder assembly according to claims 1 to 5, characterized in that the top portion of the piston (1) has a dimension larger than the remaining portion of the piston (1).
7. A piston/cylinder assembly according to claims 1 to 6, characterized in that the top portion of the cylinder (2) has a dimension smaller than the remaining portion of the cylinder (2).
8. A piston/cylinder assembly according to claims 1 to 7, characterized in

that the piston (1) is conical.

9. A piston/cylinder assembly according to claims 1 to 8, characterized in that the piston (1) has a circle-segment shape.

10. A piston/cylinder assembly according to claims 1 to 9, characterized in that the cylinder (2) has frustum-type geometry.

11. A piston/cylinder assembly according to claims 1 to 10, characterized in that the cylinder (2) has a circle-segment shape.

12. A linear compressor characterized by comprising a piston/cylinder assembly as defined in claims 1 to 11.

13. A piston/cylinder assembly, the piston (1) being displaceably positioned within the cylinder (2),

the piston (1) moving between a top dead center (TDC/PMS) and a bottom dead center (BDC/PMI),

between an inner wall of the cylinder (2) and an outer wall of the piston (1) there being a perimeter clearance (12) for aerostatic bearing arrangement of the piston (1),

the assembly being characterized in that:

- the piston/cylinder assembly having varying cross-section defining a perimeter clearance (12) which is minimum when the piston (1) is at its top dead center (TDC/PMS), and
- the closest to the head (3) the piston (1) is, the smaller the perimeter clearance.