Side channel compressor having a seal assembly

The present patent application claims the priority of German patent application DE 10 2016 222 430.1, the content of which is incorporated herein through reference.

Embodiments of the present invention relate to a side channel compressor for compressing a gas such as air or a technical gas. The side channel compressor is embodied, for example, as a side channel fan.

Side channel compressors are generally known from the prior art. The efficiency level of a side channel compressor is dependent, inter alia, on the leakage current which occurs. In order to avoid such a leakage current, corresponding seal assemblies are used. It is disadvantageous that seal assemblies frequently experience wear over the service life of the side channel compressor, leading to a reduction in the efficiency level. In addition, the sealing effect of the seal assemblies is not always satisfactory.

Embodiments of the present invention seek to overcome the disadvantages of the prior art. In particular, a side channel compressor may have an efficiency level which is, in particular, sustained or extremely high over all the operating states is to be provided. In particular, leakage current may be avoided in a sustained fashion or over all the operating states.

This object is achieved according to embodiments of the invention by means of the features which are specified in claim 1. The core of the invention lies in the fact that the at least one sealing device avoids a leakage current which forms, for example, owing to prevailing pressure conditions across the at least one gap between the housing and the at least one

impeller. The gap is therefore present between parts of the side channel compressor which rotate with respect to one another.

According to a first aspect of the present invention, there is provided a side channel compressor for compressing a gas, having a housing, having at least one impeller which is arranged in the housing and can be driven in rotation about a central axis, and having at least one seal assembly which is arranged in the housing and has i) at least one sealing device which seals at least one gap between the housing and the at least one impeller, and is forced radially outward with respect to the central axis in order to keep the at least one gap small, and ii) at least one sealing- device-holding device which holds the at least one sealing device in an axially secured fashion with respect to the central axis, and has at least one main holding body.

Since the at least one sealing device is forced, in particular pressed, radially outward, changes in volume which occur during the operation of the side channel compressor, in particular owing to temperature fluctuations, can be reliably compensated. Deformations, in particular thermally induced deformations, of the at least one sealing device are therefore not critical. The at least one sealing device is advantageously forced, in particular pressed, in a homogeneous or uniform fashion radially outward. The at least one remaining gap between the housing and the at least one impeller is therefore kept small for all operating states.

The at least one sealing-device-holding device prevents the at least one sealing device from migrating or shifting in the axial direction. The at least one sealing device is therefore secured against axial migration. Leakage currents or increased wear can therefore be avoided.

The at least one sealing device is preferably annular and advantageously has a radially outwardly facing sealing surface which extends adjacent to the at least one impeller, in particular with respect to the bearing ring base thereof and abuts there in a seal-forming fashion. It is advantageous if the at least one sealing device has, in the mounted state, an external diameter which corresponds to an internal diameter of the bearing ring.

The at least one sealing device is advantageously formed by at least one sealing strip or at least one sealing ribbon. The sealing device is preferably in one part. It is

Claims:

1. A side channel compressor for compressing a gas,

a) having a housing,

b) having at least one impeller which is arranged in the housing and can be driven in rotation about a central axis, and

c) having at least one seal assembly which is arranged in the housing and has

i) at least one sealing device which

- seals at least one gap between the housing and the at least one impeller, and
- is forced radially outward with respect to the central axis in order to keep the at least one gap small, and

ii) at least one sealing- device-holding device which

- holds the at least one sealing device in an axially secured fashion with respect to the central axis, and
- has at least one main holding body.

2. The side channel compressor as claimed in claim 1, **wherein** the at least one sealing-device-holding device and the at least one sealing device are axially immovable, in the mounted state, in relation to one another with respect to the central axis.

3. The side channel compressor as claimed in claim 1 or 2, **wherein** the at least one sealing-device-holding device has at least one holding projection which projects radially with respect to the central axis from the at least one main holding body and engages in a holding fashion on the at least one sealing device.

4. The side channel compressor as claimed in claim 3, **wherein** the at least one holding projection engages laterally on the outside of the at least one sealing device.

5. The side channel compressor as claimed in claim 3 or 4, **wherein** the at least one holding projection projects radially outward with respect to the central axis from the at least one main holding body.

6. The side channel compressor as claimed in one of claims 3 to 5, **wherein** the at least one holding projection is arranged on the edge of the at least one main holding body.

7. The side channel compressor as claimed in one of claims 3 to 6, **wherein** the at least one holding projection is bent out from the at least one main holding body.

8. The side channel compressor as claimed in one of the preceding claims, **wherein** the at least one sealing-device-holding device is axially immovable with respect to the central axis in relation to the housing.

9. The side channel compressor as claimed in one of the preceding claims, **wherein** the at least one sealing-device-holding device has at least one spring projection which projects radially with respect to the central axis from the at least one main holding body and is supported in relation to the housing, and forces the at least one sealing device radially outward with respect to the central axis.

10. The side channel compressor as claimed in claim 9, **wherein** the at least one spring projection is constructed in the manner of a tab.

11. The side channel compressor as claimed in claim 9 or 10, **wherein** the at least one spring projection projects radially inward with respect to the central axis from the at least one main holding body.

12. The side channel compressor as claimed in one of claims 9 to 11, **wherein** the at least one spring projection is bent out from the at least one main holding body.

13. The side channel compressor as claimed in one of claims 9 to 12, **wherien** the at least one spring projection is arranged in a spaced-apart fashion on the edge of the at least one main holding body.

14. The side channel compressor as claimed in one of claims 3 to 7 and as claimed in one of claims 9 to 13, **wherien** the at least one holding projection and the at least one spring projection project radially in opposite directions from the at least one main holding body.

15. The side channel compressor as claimed in one of the preceding claims, **wherein** the at least one sealing-device-holding device is embodied in one part.