

Compressor and method for compressing a working medium

The invention relates to a compressor comprising:

- a compressor piston compressing a working medium,
- 5 a seal for sealing the compressor piston,
- a magazine containing a plurality of replacement seals,
- a replacement device for replacing the seal with one of the replacement seals of the magazine.

10 The invention also relates to a method for compressing a working medium, comprising the steps of:

- moving a compressor piston compressing the working medium,
- wherein the compressor piston is sealed with a seal,
- providing a magazine with a plurality of replacement seals,
- 15 replacing the seal with one of the replacement seals of the magazine.

As described in EP 3 514 380 A1, the replacement of seals in conventional high-pressure compressors is very complicated and
20 time-consuming. In contrast, EP 3 514 380 A1 proposes a compressor in which seal replacement is automated. If the high-pressure seal can no longer guarantee the sealing of the high-pressure piston due to wear or damage, a replacement device is activated to replace the high-pressure seal with a replacement high-pres-
25 sure seal. If all (replacement) high-pressure seals are worn, the magazine as a whole can be replaced with a corresponding magazine with unused replacement high-pressure seals or new replacement high-pressure seals can be inserted into the magazine. In this prior art, various designs of magazines have already
30 been disclosed with which the individual replacement high-pressure seals can be kept in stock. Depending on the design, the magazine can be rotated or moved.

This state of the art provides a significant improvement over
35 conventional high-pressure compressors, which are used, for example, for the provision of high-pressure compressors. Disadvantageously, however, the number of replacement seals in the

rotary magazine is limited due to space constraints. The positioning accuracy could also be increased. These disadvantages are also present in the sliding version of the magazine, in which the replacement high-pressure seal is arranged in the same plane as the high-pressure seal.

The further general state of the art is illustrated by JP H08 177749 A, EP 2 721 297 B1 and DE 82 24 258 U1.

- 10 Accordingly, the object of the invention is to alleviate or eliminate at least some of the disadvantages of the prior art. In particular, the invention aims to further reduce the number of service operations required to replace the seal.
- 15 In the compressor with replacement device for replacing the seal according to the invention, the centre axes of the replacement seals are arranged substantially aligned along a longitudinal axis of the magazine.
- 20 For the purposes of this disclosure, the indications of location and direction, such as "up", "down", "horizontal", "vertical", refer to the intended state of use of the compressor.

Thus, the replacement seals (with the unused sealing elements) are arranged in a stock position with aligned centre axes, i.e. aligned in a line, along the longitudinal axis of the magazine. This design makes it possible to store a significantly larger number of replacement seals in the magazine ("new magazine") in a space-saving manner. This means that the intervals between service calls can be further increased.

In a preferred embodiment, the seal comprises a particularly ring-shaped seal carrier to which at least one ring-shaped sealing element is attached. During compressor operation when the working medium is compressed, the annular sealing element is in sealing contact with the jacket of the compressor piston. Furthermore, the seal can comprise an axial sealing element for sealing in the longitudinal direction of the compressor piston.

The replacement seals are preferably identical to the seal.

The compressor piston is preferably a plunger piston which can move back and forth along a cylinder. The compressor piston can be driven in various ways, for example with a hydraulic pump. The compressor can comprise one or more compressor stages.

In a preferred embodiment, the magazine comprises a longitudinal guide for guiding the replacement seals substantially in the direction of the longitudinal axis of the magazine. The longitudinal guide is preferably set up to hold the replacement seals laterally, i.e. in any direction perpendicular to the longitudinal axis of the magazine, essentially free of play. Thus, in the stock position, the replacement seals are arranged to move within the magazine exclusively in the direction of the longitudinal axis of the magazine. The longitudinal guide can, for example, comprise guide rods that extend in the direction of the longitudinal axis of the magazine.

In a preferred embodiment, the replacement seals are each stacked in a substantially horizontal position (i.e. with the main plane of the replacement seal substantially horizontal) one above the other along the magazine. Thus, in this embodiment, the replacement seals are arranged as a substantially vertical stack along the magazine. In this embodiment, the longitudinal axis of the magazine extends essentially in a vertical direction. Advantageously, a large number of replacement seals can thus be stored in a space-saving manner. The uppermost replacement seal can be moved upwards from the stock position within the magazine to an exchange position to enable the replacement seal to be exchanged.

For replacing the seal with the replacement seal, it is favourable if the replacement device comprises a feed drive for displacing the replacement seals, preferably together, essentially in the direction of the longitudinal axis of the magazine. By actuating the feed drive, the arrangement of replacement seals can be displaced along the magazine, in particular raised or

lowered in the vertical direction depending on the design, in order to transfer one of the replacement seals, in particular the uppermost replacement seal, from a stock position to an exchange position. The feed drive can be an electric motor, a
5 spindle drive, a hydraulic drive or a pneumatic drive, for example.

To raise and lower the replacement seals together, it is favourable if the replacement device comprises a platform for the
10 (top-side) arrangement of the replacement seals, whereby the feed drive is set up to move the platform together with the replacement seals. By activating the feed drive, the stack of replacement seals on the platform can be lifted in order to arrange the uppermost replacement seal in the exchange position.

15 In addition, the replacement device is preferably set up to guide the seal away from the compressor piston or to guide the replacement seal towards the compressor piston. For this purpose, the replacement device comprises a slider in a preferred
20 embodiment. On the one hand, the slider can be designed to move the seal, in particular essentially orthogonally to the longitudinal direction of the compressor piston, from an operating position aligned with the compressor piston to a replacement position aligned with the replacement seals. Furthermore, the slider
25 can be designed to move one of the replacement seals, in particular essentially perpendicular to the longitudinal axis of the magazine, from an exchange position aligned with the other replacement seals to an operating position aligned with the compressor piston. Preferably, the slider is connected to an actuator,
30 for example another electric motor, another spindle drive, hydraulic drive or pneumatic drive.

For reliable displacement of the seal between the operating position and the change position or of the replacement seal between the change position and the operating position, it is favourable if the slider comprises a mounting ring for holding the
35 seal and/or the replacement seal. Preferably, the (replacement) seal is arranged essentially free of play within the mounting ring.

To dispose of the seal after replacement, it is favourable if an additional magazine ("old magazine") is provided to hold the replaced seal.

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If the longitudinal axis of the additional magazine is essentially aligned with, i.e. in line with, the longitudinal axis of the magazine, the used seal can be disposed of particularly easily in the additional magazine.

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In a preferred embodiment, the feed drive for moving the replacement seals is also set up to move the seal arranged in the replacement position into the additional magazine. A single actuation of the feed drive can thus move the replacement seal from the stock position to the exchange position and the seal from the change position to a pick-up position within the additional magazine. In an embodiment with the slider, the feed drive can be used to move the seal from the change position within the slider to the pick-up position within the additional magazine and the replacement seal from the stock position within the magazine to the exchange position within the slider.

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In a preferred embodiment, a cover plate is arranged between each two of the replacement seals. The cover plate is preferably not connected to the replacement seal. This means that the replacement seal can remain transferred from the exchange position to the operating position without taking the neighbouring cover plate with it. This cover plate can therefore be used to close an opening in the magazine between changeover operations. Furthermore, the cover plate can be taken along at the opening of the magazine into the additional magazine when the next replacement seal moves into the exchange position. This also allows another opening of the additional magazine to be closed between replacement operations. It is also favourable that the cover plates protect the individual (replacement) seals within the (additional) magazine.

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In this embodiment, it is favourable if the magazine has a first

position claw for holding the cover plate in place and/or the additional magazine has a second position claw for holding the cover plate in place. The first or second positioning claw can comprise elastically deflectable retaining elements for engaging
5 the cover plate.

In order to release the seal from the circumference of the compressor piston, it is advantageous if the compressor piston can be displaced against one of the replacement seals of the magazine into a retracted position beyond an operational dead centre. During operation, the compressor piston moves between two
10 operational dead centres. To replace the seal, the compressor piston is moved beyond one of the dead centres into the retracted position, whereby the compressor piston is pulled out of the seal. The seal can then be transferred from the operating
15 position to the replacement position, preferably via the slider.

In a preferred embodiment of the compressor, the compressor piston is connected to an additional compressor piston via a transfer chamber. The additional compressor piston is preferably arranged essentially parallel to the compressor piston.
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In a preferred embodiment, a part, in particular the lower part, of the compressor piston is arranged in a receiving cylinder, whereby an annular gap may be formed between the compressor piston and the wall of the receiving cylinder in the first end position of the compressor. Accordingly, a part, in particular the lower part, of the additional compressor piston can be arranged in an additional receiving cylinder, whereby an additional annular gap can be formed between the additional compressor piston
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30 and the wall of the additional receiving cylinder.

The annular gap is preferably connected to an engine, for example a high-pressure pump, via a chamber, the additional annular gap is preferably connected to an engine, for example a high-pressure pump, via an additional chamber. In a first position, the chamber is connected to the pressure side of the engine via a valve, in particular a slide valve, and the additional chamber
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is connected to a suction side of the engine via a further valve, in particular a slide valve. The transfer chamber is preferably filled with a hydraulic fluid in order to redirect the movement of the compressor piston, in particular by 180°, to the additional compressor piston, so that the additional compressor piston is moved in the opposite direction to the direction of the compressor piston. In a second position, the additional chamber is connected to the pressure side and the chamber is connected to the suction side of the engine. This reverses the direction of movement of the additional compressor piston, whereby the movement is transmitted to the compressor piston via the hydraulic fluid in the transfer chamber.

The compressor piston and the additional compressor piston can be driven via the engine, in particular hydraulically or pneumatically. A pressure converter can be provided on the compressor piston, with which the annular gap is closed off from the transfer chamber. Accordingly, an additional pressure converter can be provided on the additional compressor piston, with which the additional annular gap is closed off from the transfer chamber. The (pneumatic or hydraulic) drive pressure is transmitted to the hydraulic fluid in the transfer chamber via the pressure converter or via the additional pressure converter.

The method according to the invention for compressing a working medium comprises at least the following steps:

moving a compressor piston compressing the working medium, wherein the compressor piston seals a first volume against a second volume with a seal,

providing a magazine with a plurality of replacement seals, replacing the seal with one of the replacement seals in the magazine, wherein the centre axes of the replacement seals are arranged substantially aligned along a longitudinal axis of the magazine.

Replacing the seal with one of the replacement seals in the magazine preferably comprises one or more, in particular all, of the following steps:

moving the compressor piston to a retracted position beyond an operational dead centre, and/or

moving the seal, in particular substantially perpendicular to the longitudinal direction of the compressor piston, from an operating position arranged in alignment with the compressor piston to an exchange position arranged in alignment with the replacement seals, and/or

moving the seal arranged in the change position, in particular essentially in the direction of the longitudinal axis of the magazine, to a storage position in an additional magazine, and/or

moving one of the replacement seals, in particular essentially in the direction of the longitudinal axis of the magazine, into an exchange position corresponding to the change position of the seal,

moving the replacement seals arranged in the exchange position, in particular essentially perpendicular to the longitudinal axis of the magazine, into an operating position arranged in alignment with the compressor piston, and/or

pushing the compressor piston into the replacement seal arranged in the operating position.

The preferred working medium is a gaseous working medium, in particular molecular hydrogen, natural gas, nitrogen, argon, helium, or a mixture of several of the aforementioned media.

The invention is explained further below with reference to a preferred embodiment example. According to the drawing:

Fig. 1 shows a compressor according to the invention with a replacement device for replacing a used seal with a new replacement seal.

Fig. 2 shows an embodiment of the compressor according to the invention, in which one compressor piston is connected to an additional compressor piston via a transfer chamber.

Fig. 1 shows a compressor 1, which may comprise one compressor

stage (as shown) or several compressor stages (not shown). The compressor 1 comprises at least one high-pressure compressor piston 2 with a longitudinal axis or longitudinal direction A1. The compressor piston 2 moves back and forth within a cylinder 3 between a first and a second operational dead centre. The compressor piston 2 seals a first volume 3A within the cylinder 3 from a second volume 3B by means of a (high-pressure) sealing device, hereinafter referred to as seal 4 for short. The seal 4 comprises a seal carrier 4A, on which an annular sealing element 5 with a centre axis 6 (i.e. an axis passing through the centre of the annular sealing element 5 in the axial direction) and an axial seal 4B are provided. In the operating position, the centre axis 6 of the seal 4 is aligned, i.e. in line, with the longitudinal direction A1 of the compressor piston 2. When the working medium is compressed, the ring-shaped sealing element 5 sits sealingly on the jacket of the compressor piston 2.

As can also be seen from Fig. 1, a magazine 7 is provided with several, in particular at least 5, preferably more than 10, replacement (high-pressure) seals 8, which are designed identically to the seal 4. Thus, the replacement seals 8 each comprise a replacement seal carrier 9A, a ring-shaped circumferential replacement sealing element 9B with a centre axis 10 (i.e. an axis passing through the centre of the ring-shaped replacement sealing element 9B in the axial direction) and a replacement axial seal 9C. With the aid of a replacement device 11, the seal 4 can be replaced with one of the replacement seals 8 of the magazine 7.

As can also be seen from Fig. 1, in the stock position shown the centre axes 10 of the replacement seals 8 are arranged in alignment with one another, i.e. in a line, along a central longitudinal axis A2 of the magazine 7. If the longitudinal axis A2 of the magazine 7 extends in a vertical direction, as in the example shown, the replacement seals 8 are each stacked essentially in a horizontal position, i.e. with vertically aligned centre axes 10, one above the other along the longitudinal axis A2 of the magazine 7. The magazine 7 comprises a longitudinal guide 12, in this case with individual guide rods, which hold the

replacement seals 6 in position laterally, i.e. in any direction perpendicular to the longitudinal axis A2.

As can also be seen from Fig. 1, the replacement device 11 comprises a feed drive 13 for displacing the replacement seals 8 in the direction of the longitudinal axis A2 of the magazine 7. In addition, the replacement device 11 comprises a platform 14, which is connected, for example, via driver rods or directly to the feed drive 13. The replacement seals 8 are arranged on the platform 14. By activating the feed drive 13, the platform 14 along with the replacement seals 8 can be moved upwards or downwards as required.

As can also be seen in Fig. 1, the replacement device 11 comprises a slider 15. The slider 15 can be used to move the seal 4 in a direction perpendicular to the longitudinal direction A1 of the compressor piston 2 from the operating position shown in Fig. 1 to a change position adjacent to, in this case above, the magazine 7. In the operating position, the centre axis 6 of the seal 4 is aligned with the longitudinal axis A1 of the compressor piston 2. In the change position, the centre axis 6 of the seal 4 is aligned with the longitudinal axis A2 of the magazine 7. In addition, the slider 15 can be used to move one of the replacement seals 8 in a direction perpendicular to the longitudinal axis A2 of the magazine 7 (and thus also parallel to the longitudinal direction A1 of the compressor piston 2 in the embodiment shown) from an exchange position arranged concentrically to the magazine to an operating position. In the exchange position, the centre axis 10 of the replacement seal 8 is aligned with the longitudinal axis A2 of the magazine 7. In the operating position, the centre axis 10 of the replacement seal 8 is aligned with the longitudinal axis A1 of the compressor piston 2.

As can also be seen from Fig. 1, the slider 15 in the embodiment shown comprises a mounting ring 16, which (depending on the process step) receives the seal 4 or the replacement seal 8 on the inside. The slider 15 is slidably mounted in a base 15A of the compressor. To move the slider 15, the slider 15 is connected to

an actuator 15B, for example a hydraulic cylinder-piston drive. A sliding ring 15C serves as an upper limit for the slider 15.

As can also be seen in Fig. 1, the compressor 1 also comprises a
5 additional magazine 17, in which the replaced seal 4 as well as
used replacement seals 8 can be stored. For illustration pur-
poses, a used seal 23 is arranged in the additional magazine 17
in Fig. 1. The longitudinal axis of the additional magazine 17
is aligned, i.e. in a line, with the longitudinal axis A2 of the
10 magazine 7. In the embodiment shown, the additional magazine 17
is arranged neighbouring, in this case above, the magazine 7.
Corresponding to the magazine 7, the additional magazine 17 is
designed to hold the seal 4 and used replacement seals 8 with
their centre axes aligned with one another. The feed drive 13
15 described above is designed to move the seal 4, which has been
moved into the change position, from the slider 15 into the
storage position in the additional magazine 17 and to move the
foremost, in this case the uppermost, replacement seal 8 from
the stock position in the magazine 7 into the exchange position
20 in the slider 15.

As can also be seen in Fig. 1, cover plates 18 are each arranged
between two replacement seals 8. The magazine 7 comprises a
first (lower) positioning claw 19 for retaining one of the cover
25 plates 18. The additional magazine 17 comprises a second (upper)
positioning claw 20 for holding one of the cover plates 18. The
first 19 and the second positioning claw 20 each comprise elas-
tically deflectable retaining elements.

30 As can be seen from Fig. 1, the compressor piston 2 can be moved
into a retracted position beyond the operational first dead cen-
tre shown in Fig. 1 in preparation for the seal change, so that
the annular sealing element 5 of the seal 4 is released from the
jacket of the cylinder piston 2 in the axial direction.

35 As can also be seen from Fig. 1, a pre-tensioning device 21 is
provided, which is actuated in particular hydraulically or with
a type of gas. The pre-tensioning device 21 presses the seal 4

against one end face of the cylinder barrel 3. The axial seal 4B seals the cylinder barrel 3 against the seal carrier 4A.

The procedure for replacing the seal 4 with the replacement seal 8 is as follows.

Any leakage of the working medium from the first volume 3A formed at the seal 4 is transferred to the second volume 3B. The second volume 3B is fluidically connected to a leakage detection device. This device is known in the prior art, so that the device 20 does not need to be discussed in more detail here. If a leakage at the seal 4 is detected (with a device known per se in the prior art) that exceeds a permissible level, an automatic seal replacement is initiated at the next possible point in time.

In the first step of the seal replacement, the first volume 3A in the high-pressure cylinder 3 is relieved and discharged into a chimney pipe, for example. The compressor piston 2 is moved, in this case lowered, along the first longitudinal axis A1 until the operational first dead centre, in this case the lower dead centre, for example 260 mm, is exceeded. To prepare for the seal change, the stroke of the compressor piston 2 can reach 300 mm, for example.

In the next step, the pre-tensioning device 21 is transferred to a relaxed state, which releases the seal 4.

In the next step, the actuator 15B for slider 15 is actuated. This moves the slider 15 with the seal 4 from the operating position to the change position. The seal 4 is placed on the cover or separating plate 18, which closes the opening of the magazine 7.

The feed drive 13 is then actuated, which advances the platform 14 along with the replacement seals 8. The stack of replacement seals 8 is lifted until another of the cover plates 18, along with the replacement seal 8 on it, engages in the first

positioning claw 19. The cover plate 18, which closes the magazine 7 and is engaged in the first position claw 19, is lifted along with the worn seal 4 until this cover plate 18 engages in the second position claw 20. The seal 4 is thus stored in the additional magazine 17 (i.e. in the old magazine).

The platform 14 can then be lowered again by the feed drive 13. The replacement seal 8 arranged in the slider 15 is moved into the operating position by the actuator 15b.

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Finally, the compressor piston 2 is transferred to the operating stroke position. To do this, the compressor piston 2 is pushed along the first longitudinal axis A1 into the replacement seal 8 arranged in the operating position. The pre-tensioning device 21 is then actuated to press the replacement seal 8 against the cylinder barrel 3. Thus the first space 3A is sealed against the environment and the second space 3B by the axial sealing element and the annular sealing element of the replacement seal 8.

20 In one embodiment example, the compressor 1 is used to supply hydrogen with a maximum outlet pressure of 1050 bar. The compressor piston 2 can, for example, be driven by a hydraulic fluid.

25 Fig. 2 shows a preferred embodiment of the compressor 1, in which the compressor piston 2 is connected to an additional compressor piston 25 via a transfer chamber 24. The additional compressor piston 25 is arranged essentially parallel to the compressor piston 2. Part of the compressor piston 2 is arranged in a receiving cylinder 26, with an annular gap 27 being formed between the compressor piston 2 and the wall of the receiving cylinder 26 in the first end position of the compressor 1 (shown in Fig. 2). Accordingly, a part of the additional compressor piston 25 is arranged in an additional receiving cylinder 28, whereby an additional annular gap 33 is formed between the additional compressor piston 25 and the wall of the additional receiving cylinder 28. The annular gap 27 is connected to an engine, for example a high-pressure pump, via a chamber 29, and the

additional annular gap 33 is connected to an engine, for example a high-pressure pump, via an additional chamber 30. In the position shown, the chamber 29 is connected to the pressure side of the engine via a valve, in particular a slide valve, and the additional chamber 30 is connected to a suction side of the engine via an additional valve, in particular a slide valve. In the design shown, the transfer chamber 24 is filled with a hydraulic fluid in order to redirect the movement of the compressor piston 2 through 180° to the additional compressor piston 25, so that the additional compressor piston 25 is moved in the opposite direction to the compressor piston 2. When one end position is reached, the valves are switched over, connecting the additional chamber 30 to the pressure side and the chamber 29 to the suction side of the engine. This reverses the direction of movement of the additional compressor piston 25, whereby the movement is transmitted to the compressor piston 2 via the hydraulic fluid in the transfer chamber 24.

The compressor piston 2 and the additional compressor piston 25 can be driven hydraulically or pneumatically via the engine. A pressure converter 31 is provided on the compressor piston 2, with which the annular gap 27 is closed off from the transfer chamber 24. Correspondingly, an additional pressure converter 32 is provided on the additional compressor piston 25, with which the additional annular gap 33 is closed off from the transfer chamber 24. The (pneumatic or hydraulic) drive pressure is transmitted to the hydraulic fluid in the transfer chamber 24 via the pressure transducer 31 or the additional pressure transducer 32.

Reference number list:

- 1 compressor
- 5 2 compressor piston
- 3 cylinder barrel
- 3A first volume
- 3B second volume
- 4 seal
- 10 4A seal carrier
- 4B axial seal
- 5 sealing element
- 6 centre axis of the seal
- 7 magazine
- 15 8 replacement seals
- 9A replacement seal carrier 9A
- 9B ring-shaped circumferential replacement sealing element 9B
- 9C replacement axial seal
- 10 centre axis of the replacement seal
- 20 11 replacement device
- 12 guides
- 13 feed drive
- 14 platform
- 15 slider
- 25 15A base
- 15B actuator for slider
- 16 mounting ring
- 17 additional magazine
- 18 cover plates
- 30 19 lower positioning claw
- 20 upper positioning claw
- 21 pre-tensioning device
- 22 leakage detection device
- 23 used seal in the old magazine
- 35 24 transfer chamber
- 25 additional compressor piston
- 26 receiving cylinder
- 27 annular gap
- 28 additional receiving cylinder

- 29 chamber
- 30 additional chamber
- 31 pressure transducer
- 32 additional pressure transducer

Claims :

1. A compressor (1) comprising

a compressor piston (2) compressing a working medium,

a seal (4) for sealing the compressor piston (2),

5 a magazine (7) containing a plurality of replacement seals (8),

a replacement device (11) for replacing the seal (4) with one of the replacement seals (8) of the magazine (7),

characterised in that

10 the centre axes (10) of the replacement seals (8) are arranged substantially in alignment along a longitudinal axis (A2) of the magazine (7).

2. Compressor (1) according to claim 1, characterised in that the replacement seals (8) are each stacked substantially horizontally one above the other along the magazine (7).

3. Compressor (1) according to claim 1 or 2, characterised in that the replacement device (11) comprises a feed drive (13) for displacing the replacement seals (8) essentially in the direction of the longitudinal axis (A2) of the magazine (7).

4. Compressor (1) according to claim 3, characterised in that the replacement device (11) comprises a platform (14) for arranging the replacement seals (8), wherein the feed drive (13) is arranged for displacing the platform (14) together with the replacement seals (8).

5. Compressor (1) according to one of claims 1 to 4, characterised in that the replacement device (11) comprises a slider (15) for displacing the seal (4), in particular substantially perpendicular to the longitudinal direction (A1) of the compressor piston (2), from an operating position aligned with the compressor piston (2) into a change position aligned with the replacement seals (8) and/or for displacing one of the replacement seals (8), in particular substantially perpendicular to the longitudinal axis (A2) of the magazine (17), from an exchange position aligned with the other of the replacement seals (8) into an operating position aligned with the compressor piston (2).

6. Compressor (1) according to claim 5, characterised in that the slider (15) comprises a mounting ring (16) for receiving the seal (4) and/or the replacement seal (8).

5 7. Compressor (1) according to one of claims 1 to 6, characterised by:

an additional magazine (17) for receiving the replaced seal (23).

10 8. Compressor (1) according to claim 7, characterised in that the longitudinal axis of the additional magazine (17) is arranged substantially in alignment with the longitudinal axis (A2) of the magazine (7).

15 9. Compressor (1) according to claim 7 or 8, characterised in that the feed drive (13) is arranged to displace the seal (4) arranged in the change position into the additional magazine (17).

20 10. Compressor (1) according to one of claims 1 to 9, characterised in that a cover plate (18) is arranged between two replacement seals in each case.

11. Compressor (1) according to claim 10, characterised in that
25 the magazine (7) comprises a first positioning claw (19) for retaining the cover plate (18) and/or in that the additional magazine (17) comprises a second positioning claw (20) for retaining an additional cover plate (18).

30 12. Compressor (1) according to one of claims 1 to 11, characterised in that the compressor piston (2) is displaceable into a retracted position beyond an operational dead centre for replacing the seal (4) with one of the replacement seals (8) of the magazine (7).

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13. A method of compressing a working medium, comprising the steps of:

moving a compressor piston (2) compressing the working

medium, wherein the compressor piston (2) is sealed with a seal (4),

providing a magazine (17) with a plurality of replacement seals (8),

5 replacing the seal (4) with one of the replacement seals (8) of the magazine (7),

characterised in that

the centre axes (10) of the replacement seals (8) are arranged substantially in alignment along a longitudinal axis (A2) of the magazine (17).

14. Method according to claim 13, characterised in that the replacement of the seal (4) with one of the replacement seals (8) of the magazine (17) comprises at least one of the following steps:

displacing the compressor piston (2) into a retracted position beyond an operational dead centre, and/or

displacing the seal (4), in particular substantially perpendicular to the longitudinal direction (A1) of the compressor piston (2), from an operating position arranged in alignment with the compressor piston (2) into a change position arranged in alignment with the replacement seals (8), and/or

displacing the seal (4) arranged in the change position, in particular essentially in the direction of the longitudinal axis (A2) of the magazine (7), into a storage position in an additional magazine (17), and/or

displacing one of the replacement seals (8), in particular substantially in the direction of the longitudinal axis (A2) of the magazine (7), into an exchange position corresponding to the change position of the seal (4), and/or

displacing the replacement seal (8) arranged in the exchange position, in particular essentially perpendicular to the longitudinal axis (A2) of the magazine (17), into an operating position arranged in alignment with the compressor piston (2), and/or

pushing the compressor piston (2) into the replacement seal (8) arranged in the operating position.