The invention relates to an elongated sealing member (19) for a vertical pressure filter (1). The elongated sealing member (19) comprises adhesive (12), a base portion (20), a ridge portion (21), and an intermediate portion (22) between the base portion (20) and the ridge portion (21). The base portion (20) comprises a plane side (29). The base portion (20) has opposite fastening portions (23) extending in traverse directions in relation to a longitudinal direction of the elongated sealing member (19), and the adhesive (12) is provided at the plane side (29) of the base portion (20). The invention relates also to a vertical pressure filter (1) comprising an elongated sealing member (19).
Published:

— with international search report (Art. 21(3))
ELONGATED SEALING MEMBER FOR A PRESSURE FILTER AND PRESSURE FILTER

Field of the invention
5 The invention relates to an elongated sealing member for a vertical pressure filter as defined in the preamble of independent claim 1.

The invention also relates to a vertical pressure filter as defined in claim 24.

Objective of the invention
10 The object of the invention is to provide an elongated sealing member for reliable sealing in a vertical pressure filter.

Short description of the invention
15 The method elongated sealing member is characterized by the definitions of independent claim 1.

Preferred embodiments of the elongated sealing member are defined in the dependent claims 2 to 23.

The vertical pressure filter of the invention is correspondingly characterized by the definitions of claim 24.

Preferred embodiments of the vertical pressure filter are defined in the dependent claims 25 to 34.

List of figures
In the following the invention will described in more detail by referring to the figures, of which

Figure 1 shows is side view a vertical pressure filter according to an embodiment in a closed state of a filter pack of the vertical pressure filter,

Figure 2 shows the vertical pressure filter shown in figure 1 in an open state of the filter pack of the vertical pressure filter,

Figure 3 shows in cross section a detail of the vertical pressure filter shown in figure 1 in a closed state of the filter pack of the vertical pressure filter,

Figure 4 shows in cross section a detail of the vertical pressure filter shown in figure 1 in a closed state of the filter pack of the vertical pressure filter,

Figure 5 shows in shows in cross section a detail of a movable filter plate of the vertical pressure filter shown in figure 1.

Figure 6 shows a section of the elongated sealing member of the vertical pressure filter shown in figure 1.

Figures 7 and 8 shows in shows in cross section the elongated sealing member shown in
Figure 6,

Figure 9 shows a section of a first alternative embodiment of the elongated sealing member,

Figure 10 shows in shows in cross section the elongated sealing member shown in figure 9,

Figure 11 shows a section of a second alternative embodiment of the elongated sealing member,

Figure 12 shows in shows in cross section the elongated sealing member shown in figure 11,

Figure 13 shows a section of a third alternative embodiment of the elongated sealing member, and

Figures 14 and 15 shows in shows in cross section the elongated sealing member shown in figure 13.

**Detailed description of the invention**

The invention relates to an elongated sealing member for a vertical pressure filter 1 and to a vertical pressure filter 1.

First the elongated sealing member 19 for a vertical pressure filter 1 and some embodiments and variants of the elongated sealing member 19 will be described in greater detail.

The elongated sealing member 19 comprises adhesive 12.

The elongated sealing member 19 comprises a base portion 20, a ridge portion 21, and an intermediate portion 22 between the base portion 20 and the ridge portion 21.

The base portion 20 comprises a plane side 29

The base portion 20 has opposite fastening portions 23 extending in traverse directions in relation to a longitudinal direction of the elongated sealing member 19.

The adhesive 12 is provided at the plane side 29 of the base portion 20.

An advantage with an elongated sealing member 19 having such configuration is that the ridge portion 21 can adapt to the form of the upward facing surface section 9 of the endless movable filter fabric belt 6 and prevents effectively gaps to be formed between the elongated sealing member 19 and the upward facing surface section 9 of the endless movable filter fabric belt 6. Another advantage is that the intermediate portion 22 forms a large portion of the elongated sealing member 19 that presses against the upward facing surface section 9 of the endless movable filter fabric belt 6 in the closed state of the filter pack 2. An advantage is that adhesive 12 provides for additional sealing preventing fluid from passing between the elongated sealing member 19 and the surface of the vertical pressure filter 1 to which the elongated sealing member 19 is fastened. An advantage is that the adhesive 12 on the elongated sealing member 19 facilitates fastening of the elongated sealing member 19.

The elongated sealing member 19 is preferably, but not necessarily, completely formed
of elastically deformable material. An advantage of this is that the elongated sealing member 19 can easily adapt to the form of the upward facing surface section 9 of the endless movable filter fabric belt 6, because the elongated sealing member 19 contains no elastically undeformable parts such as parts of metal.

The outer surface of the elongated sealing member 19 is preferably, but not necessarily, completely formed of elastically deformable material. An advantage of this is that the elongated sealing member 19 can easily adapt to the form of the upward facing surface section 9 of the endless movable filter fabric belt 6. In such case the elongated sealing member 19 is preferably, but not necessarily, free of metal.

The base portion 20 has preferably, but not necessarily, a rectangular cross section. An advantage of this is that a rectangular cross section facilitates mounting of the elongated sealing member 19. Another advantage of this is that a rectangular cross section creates an even pressure on the plane side 29 of the base portion 20, which means that the adhesive 12 is evenly pressed already when the filter plates 3 for the first time are brought into the closed state.

The base portion 20 has preferably, but not necessarily, first opposite side planes 30, which are essentially perpendicular with respect to the plane side 29 of the base portion 20. An advantage of this is that it facilitates mounting of the elongated sealing member 19. Another advantage of this is that the first opposite can press against vertical side walls of the he circumferential groove 11 in said filter plate.

The height A of the base portion 20 as measured in a direction perpendicular to the plane side 29 of the base portion 20 can be between 1 and 5 mm, preferable between 1 and 3 mm, such as about 2 mm.

The width B of the base portion 20 as measured in a direction along to the plane side 29 of the base portion 20 can be between 40 and 50 mm, preferable between 42 and 46 mm, such as about 44 mm. An advantage of this is that the width B of the base portion 20 is so wide that the elongated sealing member 19 can centralize itself in a circumferential groove 11 in a lower surface 4 of a horizontally arranged and vertically movable filter plate 3 by pressing against possible third opposite side planes 32 in the circumferential groove 11 in the lower surface 4 of the horizontally arranged and vertically movable filter plate 3. Another advantage of this is that the width B of the base portion 20 is so wide that opposite fastening portions 23 of the base portion 20 can more easily reach under possible retainers 17 provided for keeping the elongated sealing member 19 in the circumferential groove 11 in the lower surface 4 of the horizontally arranged and vertically movable filter plate 3. Another advantage of this is that the width B of the base portion 20 is so wide that a large plane side 29 is created for adhesive 12, which presses against a possible plane surface 33 forming a bottom of the circumferential groove 11 in the lower surface 4 of the horizontally arranged and vertically movable filter plate 3, which in turn increases the sealing effect between the elongated sealing member 19 and the horizontally arranged and vertically movable filter plate 3. Another advantage of this is that the width B of
the base portion 20 is so wide that a large plane side 29 is created for adhesive 12, so that the adhesive better can retain the elongated sealing member 19 in the circumferential groove 11 in the lower surface 4 of the horizontally arranged and vertically movable filter plate 3.

Adhesive 12 is preferably, but not necessarily, provided on 30 to 100 %, such as on 75 to 95 %, of the plane side 29 of the base portion 20 of the elongated sealing member 19.

The intermediate portion 22 can have a partly undulating profile between the ridge portion 21 and the base portion 20.

The intermediate portion 22 can have a rounded edge at the base portion 20. The radius of the rounded edge can be between 1 and 3 mm, preferably about 2 mm.

The intermediate portion 22 may have opposite second opposite side planes 31, which extend essentially perpendicularly to the plane side 29 of the base portion 20. An advantage of this is that such configuration of the intermediate portion 22 makes distribution of pressure even on the adhesive 12 when the filter plates 3 are brought into the closed state.

The height C of the intermediate portion 22 as measured in a direction perpendicular to the plane side 29 of the base portion 20 may be between 7 and 13 mm, preferably between 8 and 10 mm, such as about 9 mm. An advantage of this is that the intermediate portion 22 on one hand is so high that a sufficient pressure is subjected on the adhesive 12, but that the intermediate portion 22 on the other hand is so low that the ridge portion 21 can have a sufficient height to effectively press against the upward facing surface section 9 of the endless movable filter belt fabric 7.

The width D of the intermediate portion 22 as measured in a direction parallel with the plane side 29 of the base portion 20 may be between 30 and 40 mm, preferably between 32 and 38 mm, such as 36 mm. An advantage of this is that the intermediate portion 22 on one hand is so wide that a pressure is subjected on the adhesive 12 on a large area.

The intermediate portion 22 may, as shown in figures 6 to 12, comprise a first intermediate section 24 between the base portion 20 and the rounded ridge portion 21, and a second intermediate section 25 between the first intermediate section 24 and the base portion 20. The height E of the first intermediate section 24 may be between 2 and 5 mm, preferably between 2 and 4 mm, such as about 3 mm, and the height F of the second intermediate section 25 may be between 5 and 8 mm, preferably between 5 and 7 mm, such as about 6 mm.

The ridge portion 21 may be a rounded ridge portion 21. An advantage of this is a durable and wear-resistant ridge portion 21.

The height G of the ridge portion 21 as measured in a direction perpendicular to the plane side 29 of the elongated sealing member 19 may be between 1 and 4 mm, preferably between 1 and 3 mm, such as about 2 mm.

The width H of the ridge portion 21 as measured in a direction in parallel with the plane side 29 of the elongated sealing member 19 may be between 1 and 4 mm, preferably between 1 and 3 mm, such as about 2 mm.
The adhesive 12 may be being protected by a removable strip. An advantage of this is easy attachment of the elongated sealing member 19.

The elongated sealing member 19 is preferably, but not necessarily, of one-piece construction. An advantage with forming a seal 10 of a single elongated sealing member 19 is that less joints, possible only one joint, is formed in the seal 10, where the seal 10 can fail. To fasten a seal 10 in the form of a single elongated sealing member 19 by means of adhesive 12 is also quick and easy.

The elongated sealing member 19 comprises preferably, but no necessarily, a material having Shore A hardness between 40 and 100, preferably between 50 and 90.

The opposite fastening portions 23 of the base portion 20 may be at least partly formed of elongated metal profiles 26, as in the first alternative embodiment shown in figures 9 and 10.

The elongated sealing member 19 may, as in the second alternative embodiment shown in figures 11 and 12, comprise a first material 27 having Shore A hardness between 50 and 150, preferably between 90 and 150, and a second material 28 having Shore A hardness between 40 and 100, preferably between 50 and 90, so that by at least the opposite fastening portions 23 of the base portion 20 being made of the first material 27. An advantage of this is that a first material 27 having such hardness provides for sufficient flexible deformability to facilitate mounting of the elongated sealing member 19 but for sufficient rigidity to maintain the form of the base portion 20 elongated sealing member 19 and that a second material 28 having such flexible deformability to provide for sufficient sealing action.

The elongated sealing member 19 may comprise a first material 27 having Shore A hardness between 50 and 150, preferably between 90 and 150, and a second material 28 having Shore A hardness between 40 and 100, preferably between 50 and 90, so that by at least the ridge portion 21 being made of the second material 28. In such case, the elongated sealing member 19 is preferably, but not necessarily, made by first extruding one of the first material 27 and the second material 28 and thereafter by extruding the other of the first material 27 and the second material 28 onto said one of the first material 27 and the second material 28. In such case, the first material 27 is preferably, but not necessarily, in direct contact with the second material 28 i.e. without any intermediate material such as adhesive between the first material 27 and the second material 28. An advantage of this is that the structure of the elongated sealing member intact, which has the advantage that fluids cannot leak through the elongated sealing member 19.

The elongated sealing member 19 comprising any of the following: Natural rubber (NR), Styrene butadiene rubber (SBR), Butyl rubber (IIR), Nitrile rubber (NBR), Epichlorohydrin rubber (ECO, CO), Chloroprene rubber (CR), Urethane rubber (U), Fluoro rubber (FPM), Silicone rubber (Q), Chlorsulphonated polyethylene rubber (CSM), Ethylene propylene rubber (EPDM), Styrenic block copolymers (TPE-s), Polyolefin blends (TPE-o), Elastomeric alloys (TPE-v or TPV), Thermoplastic polyurethanes (TPU), Thermoplastic copolyester, and Thermoplastic polyamides.
The adhesive 12 is preferably, but not necessarily, elastically deformable after curing to withstand alternating opening state and closing state of the filter pack 2.

The adhesive 12 is preferably, but not necessarily, selected so that it can attach to elastomers and metals.

The adhesive 12 is preferably, but not necessarily, selected so that it retains its adhesive function at a temperature range between -10 and 90°C.

The adhesive 12 comprises preferably, but not necessarily, any of the following: a heat-activated adhesive, a heat-activated tape, an acrylic foam adhesive, and an acrylic foam tape.

In an embodiment, the adhesive 12 is an heat-activated tape and bonded to the elongated sealing member 19 by heat-activation. The heat-activated adhesive guarantees a durable none especially, but not excluding others, to elongated sealing members 19 made of EPDM and TPE rubber.

In an embodiment, the adhesive 12 is an acrylic foam tape. Based on the visco-elastic consistence of acrylic foam tapes, a high cohesiveness combined with a brilliant shock- and weathering resistance is achieved.

The elongated sealing member 19 is preferably, but not necessarily, symmetrical with respect to a center plane X that is vertical to the plane side 29.

Next the vertical pressure filter 1 and some embodiments and variants of the vertical pressure filter 1 will be described in greater detail.

The vertical pressure filter 1 comprises a filter pack 2 comprises a plurality of separate horizontally arranged and vertically movable filter plates 3, each having a lower surface 4 and an upper surface 5.

The vertical pressure filter 1 comprises an endless movable filter fabric belt 6 arranged in zigzag manner between the filter plates 3.

The vertical pressure filter 1 comprises closing and opening means 7 for vertically pressing said plurality of separate horizontally arranged and vertically movable filter plates 3 against each other into a closed state of the filter pack 2 to form filter chambers 8 between filter plates 3 and an upward facing surface sections 9 of the endless movable filter fabric belt 6 and for vertically moving said plurality of separate horizontally arranged and vertically movable filter plates 3 away from each other into an open state of the filter pack 2 to open said filter chambers 8.

The vertical pressure filter 1 comprises at least one elongated sealing member 19 as described earlier or according to an embodiment as described earlier arranged in a circumferential groove 11 in the lower surface 4 of at least one separate horizontally arranged and vertically movable filter plate, wherein said at least one elongated sealing member 19 is configured to press against the upward facing surface section 9 of the endless movable filter fabric belt 6 in the closed state of the filter pack 2 and wherein said at least one elongated sealing member 19 being fastened by means of adhesive 12.
An advantage is that adhesive 12 provides for additional sealing.

Another advantage is that a seal 10 of simple and less expensive construction can be used.

Another advantage is that the adhesive 12 provides for additional sealing by preventing fluid from passing between said at least one elongated sealing member 19 and the surface of the vertical pressure filter 1 to which said at least one elongated sealing member 19 is fastened.

Said at least one separate horizontally arranged and vertically movable filter plate 3 may, as shown in the figures, comprise a bottom plate 13, a frame 14 below the bottom plate 13, and an elastic and waterproof diaphragm 15 attached between the bottom plate 13 and the frame 14. In such case, the filter chamber 8 is in the closed state limited by the elastic and waterproof diaphragm 15, the endless movable filter fabric belt 6 and the frame 14 so that the filter chamber 8 has a volume. In such case, the vertical pressure filter 1 comprises inflating means for inflating fluid such as liquid or gas between the elastic and waterproof diaphragm 15 and the bottom plate 13 to reduce the volume of the filter chamber 8 in the closed state.

If said at least one separate horizontally arranged and vertically movable filter plate 3 comprise a bottom plate 13, a frame 14 below the bottom plate 13, and an elastic and waterproof diaphragm 15 attached between the bottom plate 13 and the frame 14, the filter chamber 8 may, as shown in the figures, be horizontally limited by the frame 14.

If said at least one separate horizontally arranged and vertically movable filter plate 3 comprise a bottom plate 13, a frame 14 below the bottom plate 13, and an elastic and waterproof diaphragm 15 attached between the bottom plate 13 and the frame 14, the lower surface 4 of at least one separate horizontally arranged and vertically movable filter plate 3 may, as shown in the figures, be formed at the frame 14.

If said at least one separate horizontally arranged and vertically movable filter plate 3 comprise a bottom plate 13, a frame 14 below the bottom plate 13, and an elastic and waterproof diaphragm 15 attached between the bottom plate 13 and the frame 14, the frame 14 may, as shown in the figures, comprise channels for feeding material to be filtered such as slurry and fluids such as water and air into the filter chamber 8 in the closed state.

If said at least one separate horizontally arranged and vertically movable filter plate 3 comprise a bottom plate 13, a frame 14 below the bottom plate 13, and an elastic and waterproof diaphragm 15 attached between the bottom plate 13 and the frame 14, the bottom plate 13 may comprise a drainage screen 16 for supporting the endless movable filter fabric belt 6 and a drainage channel 18 in fluid connection with the drainage screen 16 for leading filtrate from the drainage screen 16 to the outside of the bottom plate 13, as shown in the figures.

The vertical pressure filter 1 comprises preferably, but not necessarily, retainers 17 for keeping said at least one elongated sealing member 19 in the circumferential groove 11. The purpose of such retainers 17 is to assure that said at least one elongated sealing member 19 is in correct position and/or to provide for additional retaining action for keeping said at least one
elongated sealing member 19 in the circumferential groove 11.

The seal 10 is preferably, but not necessarily, formed of a single elongated sealing member 19. An advantage with forming the seal 10 of a single elongated sealing member 19 is that less joints, possible only one joint, is formed in the seal 10, where the seal 10 can fail. To fasten a seal 10 in the form of a single elongated sealing member 19 by means of adhesive 12 is also quick and easy.

Said at least on elongated sealing member 19 comprises preferably, but not necessarily, adhesive 12, wherein said at least one elongated sealing member 19 comprising a base portion 20, a ridge portion 21, and an intermediate portion 22 between the base portion 20 and the ridge portion 21, wherein the base portion 20 comprising a plane side 29, wherein the base portion 20 having opposite fastening portions 23 extending in traverse directions in relation to a longitudinal direction of said at least one elongated sealing member 19, and wherein the adhesive 12 being provided between the plane side 29 of said at least one elongated sealing member 19 and the filter plate. An advantage with at least one elongated sealing member 19 having such configuration is that the ridge portion 21 can adapt to the form of the upward facing surface section 9 of the endless movable filter fabric belt 6 and prevents effectively gaps to be formed between said at least one elongated sealing member 19 and the upward facing surface section 9 of the endless movable filter fabric belt 6. Another advantage is that the intermediate portion 22 forms a large portion of said at least one elongated sealing member 19 that presses against the upward facing surface section 9 of the endless movable filter fabric belt 6 in the closed state of the filter pack 2. Said at least one elongated sealing member 19 is preferably, but not necessarily, symmetrical with respect to a center plane X that is vertical to the plane side 29 of said at least one elongated sealing member 19.

The circumferential groove 11 in the lower surface 4 of at least one separate horizontally arranged and vertically movable filter plate 3 has preferably, but not necessarily, third opposite side planes 32 and a plane surface 33 between the third opposite side planes 32.

It is apparent to a person skilled in the art that as technology advanced, the basic idea of the invention can be implemented in various ways. The invention and its embodiments are therefore not restricted to the above examples, but they may vary within the scope of the claims.
Claims

1. An elongated sealing member (19) for a vertical pressure filter (1), characterized by the elongated sealing member (19) comprising adhesive (12), by the elongated sealing member (19) comprising a base portion (20), a ridge portion (21), and an intermediate portion (22) between the base portion (20) and the ridge portion (21), by the base portion (20) comprising a plane side (29), by the base portion (20) having opposite fastening portions (23) extending in traverse directions in relation to a longitudinal direction of the elongated sealing member (19), and by the adhesive (12) being provided at the plane side (29) of the base portion (20).

2. The elongated sealing member (19) according to claim 1, characterized by the elongated sealing member (19) being completely formed of elastically deformable material.

3. The elongated sealing member (19) according to claim 1, characterized by the outer surface of the elongated sealing member (19) being completely formed of elastically deformable material.

4. The elongated sealing member (19) according to claim 3, characterized by the elongated sealing member (19) being free of metal.

5. The elongated sealing member (19) according to any of the claims 1 to 4, characterized by the base portion (20) having a rectangular cross section.

6. The elongated sealing member (19) according to any of the claims 1 to 5, characterized by the base portion (20) having first opposite side planes (30), which are essentially perpendicular with respect to the plane side (29) of the base portion (20).

7. The elongated sealing member (19) according to any of the claims 1 to 6, characterized by the height A of the base portion (20) as measured in a direction perpendicular to the plane side (29) of the base portion (20) being between 1 and 5 mm, preferable between 1 and 3 mm, such as about 2 mm.

8. The elongated sealing member (19) according to any of the claims 1 to 7, characterized by the width B of the base portion (20) as measured in a direction along to the plane side (29) of the base portion (20) being between 40 and 50 mm, preferable between 42 and 46 mm, such as about 44 mm.
9. The elongated sealing member (19) according to any of the claims 1 to 8, characterized by the intermediate portion (22) having opposite second opposite side planes (31), which extend essentially perpendicularly to the plane side (29) of the base portion (20).

10. The elongated sealing member (19) according to any of the claims 1 to 9, characterized by the height C of the intermediate portion (22) as measured in a direction perpendicular to the plane side (29) of the base portion (20) being between 7 and 13 mm, preferably between 8 and 10 mm, such as about 9 mm.

11. The elongated sealing member (19) according to any of the claims 1 to 10, characterized by the width D of the intermediate portion (22) as measured in a direction parallel with the plane side (29) of the base portion (20) being between 30 and 40 mm, preferably between 32 and 38 mm, such as 36 mm.

12. The elongated sealing member (19) according to any of the claims 1 to 11, characterized by the ridge portion (21) being a rounded ridge portion (21).

13. The elongated sealing member (19) according to any of the claims 1 to 12, characterized by the height G of the ridge portion (21) as measured in a direction perpendicular to the plane side (29) of the elongated sealing member (19) being between 1 and 4 mm, preferable between 1 and 3 mm, such as about 2 mm.

14. The elongated sealing member (19) according to any of the claims 1 to 13, characterized by the width H of the ridge portion (21) as measured in a direction in parallel with the plane side (29) of the elongated sealing member (19) being between 1 and 4 mm, preferable between 1 and 3 mm, such as about 2 mm.

15. The elongated sealing member (19) according to any of the claims 1 to 14, characterized by the adhesive (12) being protected by a removable strip.

16. The elongated sealing member (19) according to any of the claims 1 to 15, characterized by the elongated sealing member (19) being of one-piece construction.

17. The elongated sealing member (19) according to any of the claims 1 to 16, characterized by the elongated sealing member (19) comprising a material having Shore A hardness between 40 and 100, preferably between 50 and 90.
18. The elongated sealing member (19) according to any of the claims 1 to 17, characterized by the opposite fastening portions (23) of the base portion (20) being at least partly formed of elongated metal profiles (26).

19. The elongated sealing member (19) according to any of the claims 1 to 16, characterized by the elongated sealing member (19) comprising a first material (27) having Shore A hardness between 50 and 150, preferably between 90 and 150,
   by the elongated sealing member (19) comprising a second material (28) having Shore A hardness between 40 and 100, preferably between 50 and 90, and
   by at least the opposite fastening portions (23) of the base portion (20) being made of the first material (27).

20. The elongated sealing member (19) according to any of the claims 1 to 16, characterized by the elongated sealing member (19) comprising a first material (27) having Shore A hardness between 50 and 150, preferably between 90 and 150,
   by the elongated sealing member (19) comprising a second material (28) having Shore A hardness between 40 and 100, preferably between 50 and 90, and
   by at least the ridge portion (21) being made of the second material (28).

21. The elongated sealing member (19) according to any of the claims 1 to 20, characterized by the elongated sealing member (19) comprising any of the following: Natural rubber (NR), Styrene butadiene rubber (SBR), Butyl rubber (IIR), Nitrile rubber (NBR), Epichlorohydrin rubber (ECO, CO), Chloroprene rubber (CR), Urethane rubber (U), Fluoro rubber (FPM), Silicone rubber (Q), Chlorsulphonated polyethylene rubber (CSM), Ethylene propylene rubber (EPDM), Styrenic block copolymers (TPE-s), Polyolefin blends (TPE-o), Elastomeric alloys (TPE-v or TPV), Thermoplastic polyurethanes (TPU), Thermoplastic copolyester, and Thermoplastic polyamides.

22. The elongated sealing member (19) according to any of the claims 1 to 21, characterized by the adhesive (12) comprising any of the following: a heat-activated adhesive, a heat-activated tape, an acrylic foam adhesive, and an acrylic foam tape.

23. The elongated sealing member (19) according to any of the claims 1 to 22, characterized by the elongated sealing member (19) being symmetrical with respect to a center plane X that is vertical to the plane side (29).

24. A vertical pressure filter (1) comprising a filter pack (2) comprising a plurality of separate horizontally arranged and vertically
movable filter plates (3), each having a lower surface (4) and an upper surface (5),
an endless movable filter fabric belt (6) arranged in zigzag manner between the filter plates (3),
closing and opening means (7) for vertically pressing said plurality of separate horizontally arranged and vertically movable filter plates (3) against each other into a closed state of the filter pack (2) to form filter chambers (8) between filter plates (3) and an upward facing surface section (9) of the endless movable filter fabric belt (6) and for vertically moving said plurality of separate horizontally arranged and vertically movable filter plates (3) away from each other into an open state of the filter pack (2) to open said filter chambers (8), and
at least one elongated sealing member (19) according to any of the claims 1 to 23 arranged in a circumferential groove (11) in the lower surface (4) of at least one separate horizontally arranged and vertically movable filter plate, wherein said at least one elongated sealing member (19) is configured to press against the upward facing surface section (9) of the endless movable filter fabric belt (6) in the closed state of the filter pack (2), and wherein said at least one elongated sealing member (19) being fastened by means of adhesive (12).

25. The vertical pressure filter (1) according to claim 24, characterized by said at least one separate horizontally arranged and vertically movable filter plate (3) comprise a bottom plate (13), a frame (14) below the bottom plate (13), and an elastic and waterproof diaphragm (15) attached between the bottom plate (13) and the frame (14), by the filter chamber (8) being in the closed state limited by the elastic and waterproof diaphragm (15), the endless movable filter fabric belt (6) and the frame (14) so that the filter chamber (8) has a volume, and by the vertical pressure filter (1) comprises inflating means for inflating fluid such as liquid or gas between the elastic and waterproof diaphragm (15) and the bottom plate (13) to reduce the volume of the filter chamber (8) in the closed state.

26. The vertical pressure filter (1) according to claim 25, characterized by the filter chamber (8) being horizontally limited by the frame (14).

27. The vertical pressure filter (1) according to claim 25 or 26, characterized by the lower surface (4) of at least one separate horizontally arranged and vertically movable filter plate (3) being formed at the frame (14).

28. The vertical pressure filter (1) according to any of the claims 25 to 27, characterized by the frame (14) comprising channels for feeding material to be filtered such as slurry and fluids such as water and air into the filter chamber (8) in the closed state.
29. The vertical pressure filter (1) according to any of the claims 25 to 28, characterized
by the bottom plate (13) comprises a drainage screen (16) for supporting the endless
movable filter fabric belt (6) and a drainage channel (18) in fluid connection with the drainage
screen (16) for leading filtrate from the drainage screen (16) to the outside of the bottom plate
(13).

30. The vertical pressure filter (1) according to any of the claims 24 to 29, characterized
by retainers (17) for keeping said at least one elongated sealing member (19) in the
circumferential groove (11).

31. The vertical pressure filter (1) according to any of the claims 24 to 30, characterized
by said at least one elongated sealing member (19) being in the form of a single
elongated sealing member (19).

32. The vertical pressure filter (1) according to any of the claims 24 to 31, characterized
by said at least one elongated sealing member (19) comprising adhesive (12),
by said at least one elongated sealing member (19) comprising a base portion (20), a
ridge portion (21), and an intermediate portion (22) between the base portion (20) and the ridge
portion (21),
  by the base portion (20) comprising a plane side (29),
  by the base portion (20) having opposite fastening portions (23) extending in traverse
directions in relation to a longitudinal direction of said at least one elongated sealing member
(19), and
  by the adhesive (12) being provided between the plane side (29) of said at least one
elongated sealing member (19) and the filter plate (3).

33. The vertical pressure filter (1) according to any of the claims 24 to 32, characterized
by said at least one elongated sealing member (19) being symmetrical with respect to a
center plane X that is vertical to the plane side (29).

34. The vertical pressure filter (1) according to any of the claims 24 to 33, characterized
by the circumferential groove (11) in the lower surface (4) of at least one separate
horizontally arranged and vertically movable filter plate (3) having third opposite side planes
(32) and a plane surface (33) between the third opposite side planes (32).
**INTERNATIONAL SEARCH REPORT**

**International application No**

PCT/IB2016/050726

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B01D25/127  B01D25/21  B01D25/28  B01D29/09

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

B01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tbody>
<tr>
<td>Y</td>
<td>DE 33 15 500 AI (GRAU FEINWERKTECH [DE] ; HANSEN BTR GMBH [DE]) 31 October 1984 (1984-10-31) fi gure 1</td>
<td>24-34</td>
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<tr>
<td>A</td>
<td>WO 96/24423 AI (SCAPA GROUP PLC [GB] ; SCHFR0ERS ERNST DIETER [DE]) 15 August 1996 (1996-08-15) the whole document</td>
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**Date of the actual completion of the international search**

17 January 2017

**Date of mailing of the international search report**

03/02/2017

**Form PCT/ISA210 (second sheet) (April 2005)**

* Special categories of cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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</table>
| A        | CN 104 399 294 A (CHANGXING XING SHENG NEW MATERIAL CO LTD; WANG BENHE)  
           11 March 2015 (2015-03-11)  
           the whole document | 1-34 |
| A        | US 4 274 961 A (HRS GENE)  
           23 June 1981 (1981-06-23)  
           the whole document | 1-34 |
| A        | GB 655 076 A (CHERRY BURRELL CORP)  
           11 July 1951 (1951-07-11)  
           the whole document | 1-34 |
| A        | DE 21 09 021 AI (HELMUT FISCHER)  
           30 September 1971 (1971-09-30)  
           the whole document | 1-34 |
<table>
<thead>
<tr>
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<th>Publication date</th>
<th>Patent family member(s)</th>
<th>Publication date</th>
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<tr>
<td>WO 2010121827 A1</td>
<td>28-10-2010</td>
<td>DE 102009018826 A1</td>
<td>11-11-2010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 2421627 A1</td>
<td>29-02-2012</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 2010121827 A1</td>
<td>28-10-2010</td>
</tr>
<tr>
<td>DE 3315500 A1</td>
<td>31-10-1984</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AU 692672 B2</td>
<td>11-06-1998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AU 4628996 A</td>
<td>27-08-1996</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BR 9607518 A</td>
<td>30-12-1997</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 69601075 D1</td>
<td>14-01-1999</td>
</tr>
<tr>
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<td></td>
<td>DE 69601075 T2</td>
<td>17-06-1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DK 0808204 T3</td>
<td>16-08-1999</td>
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<tr>
<td></td>
<td></td>
<td>ES 2127618 T3</td>
<td>16-04-1999</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP H10513116 A</td>
<td>15-12-1998</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TR 9600106 A2</td>
<td>21-08-1996</td>
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<tr>
<td></td>
<td></td>
<td>TW 302290 B</td>
<td>11-04-1997</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WO 9624423 A1</td>
<td>15-08-1996</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ZA 9600976 B</td>
<td>28-08-1996</td>
</tr>
<tr>
<td>CN 104399294 A</td>
<td>11-03-2015</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>GB 655076 A</td>
<td>11-07-1951</td>
<td>NONE</td>
<td></td>
</tr>
<tr>
<td>DE 2109021 A1</td>
<td>30-09-1971</td>
<td>AT 306057 B</td>
<td>26-03-1973</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH 521155 A</td>
<td>15-04-1972</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DE 2109021 A1</td>
<td>30-09-1971</td>
</tr>
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