CLAIMS

1. A piston-chamber combination comprising a chamber (2,2') which is bounded by an inner chamber wall (4), and comprising a piston (1) in said chamber (2,2') to be engagingly movable relative to said chamber wall (4) at least between a first longitudinal / circular position and a second longitudinal / circular position of the chamber (2,2'),

said chamber (2,2') having cross-sections of different cross-sectional areas and differing circumferential lengths at the first and second longitudinal / circular positions, and at least substantially continuously different cross-sectional areas and circumferential lengths at intermediate longitudinal positions between the first and second longitudinal / circular positions, the cross-sectional area and circumferential length at said second longitudinal / circular position being smaller than the cross-sectional area and circumferential length at said first longitudinal / circular position,

said piston (1) is comprising a member (12) for attachment of the separate part (6'), said member (12) is rotatable around an axle which is mounted in a suspension on the piston rod, and the separate part (6') is comprising a sealing (7), and said separate part (6') is sealingly engaging the wall (4) of said chamber (2,2'), the separate part (6') and sealing (7) made of elastically deformable impervious material, and mounted on the piston rod (5),

the piston (1) is produced to have a production-size of said separate part (6') and said sealing (7) in the stress-free and un-deformed state thereof in which the circumferential length of the piston (1) is approximately equivalent to the circumferential length of said chamber wall (4) at said second longitudinal / circular position, the piston (1) being expandable from its production size in a direction transversally with respect to the longitudinal / circular direction of the chamber (2,2') thereby providing for an expansion of the sealing (7) of the piston (1) from the production size thereof during the relative movements of the piston from said second longitudinal / circular position to said first longitudinal / circular position of said chamber (2,2'),

said separate part (6') is attached by an attachment point to at least one member (12) such that said separate part (6') can expand its circumferencial length from said attachment point, where its cross-sectional area in a plane through the center axis of the piston (1) will become smaller, when extended, when said piston (1) is moving from a 2nd longitudinal position of said chamber (2,2') to a 1st longitudinal position,

characterized by the fact that

at one end, closest to a second longitudinal / circular position of said chamber, the sealing (7) is embedded in said separate part (6'), said sealing (7) of the piston (1) is comprising sealing sections (19,20; 51,51') in a direction along the piston rod (5), said sealing (7) is up divided in said sealing sections over the circumference of said sealing (7), and, a second angle (δ,ξ) in-between two adjacent sealing sections in a transversal cross-section of the chamber is much less than 180°,

at one other end, closest to a first longitudinal / circular position of said chamber, said sealing (7') is up divided in said sections (19,20;51,51') over the circumference of said sealing (7'), and, a first angle (ε,Ψ) in-between two adjacent sealing sections in a transversal cross-section of the chamber is bigger than said second angle (δ,ξ) at said second longitudinal / circular position of the chamber.

2. A piston-chamber combination according to claim 1, wherein closest to the second longitudinal / circular position of the chamber (2') is the cross-sectional diameter (k,y) of said separate part (6') biggest, and closest to the first longitudinal / circular position of said chamber (2') is the cross-sectional diameter (j,x) of the separate part (6') smaller than the cross sectional diameter (k,y) of the separate part (6') at the second longitudinal / circular position of the chamber (2').

3. A piston-chamber combination according to claim 1, wherein said sealing sections (8) are plane sections (19,20), having transitions (21,22) in-between said sections, said sections and said transitions are comprising reinforcements (23,24), said reinforcements are communicating with each other.

4. A piston-chamber combination according to claim 1, wherein said sealing sections are curved sections (51,53,54;51',59), and are comprising in turning centers reinforcements which are positioned in a direction along the piston rod (5), said sections are comprising reinforcements, said reinforcements are communicating with each other.

5. A piston-chamber combination according to claim 3, wherein said first and second angles are between two adjacently positioned plane section.

6. A piston-chamber combination according to claim 4, wherein said first and second angles are

between two adjacently positioned reinforcement ends of turning centers in a transversal cross-section.

7. A piston-chamber combination according to claim 1, further comprising turning points (10) for the sealing and for the member (12), wherein said turning points of are closely positioned to each other, the turning points be nearby the end of the vulcanisation stroke of said sealing on the piston rod.

8. A piston-chamber combination according to claim 1, further comprising a coil spring (34,34') for suspending said separate part, said coil spring is comprising a part (44), of the round cross-section, which can turn over an angle ζ for supporting the expansion of said separate part.

9. A piston-chamber combination according to claim 8, of which member (12) is further comprising a shaped holder (38), wherein said holder has a similar round shape as the outside shape of said coil spring (34,34') for optimizing the support of the coil spring (34).

10. A piston-chamber combination according to claims 9, wherein said shaped holder is part of a portion (37) of said member (12), wherein said portion of said member (12) is retractable, by a stop (39) which is mounted on the piston rod (5).

11. A piston-chamber combination according to claim 1, wherein the member (12) is having an angle α, preferably approximately 60°, with a line perpendicular to the centre axis (3) of the piston rod (5) at a first longitudinal / circular cross-section.

12. A piston-chamber combination according to claim 1, wherein the turning point, spot (10) of the sealing (7), is positioned very near the centre (11) of the axle (13) of the member (12).

13. A pump for pumping a fluid, the pump comprising:

- a piston-chamber combination according to any of the preceding claims,
- a piston rod for engaging the piston from a position outside the chamber,
- a fluid entrance connected to the chamber and comprising a valve means, and
- a fluid exit connected to the chamber.
- said separate part (6,6') is sealingly engaging the wall (4) of said chamber (2,2'), at least from the first to the second longitudinal / circular position of the chamber.

14. A pump according to claim 13 wherein the engaging means have an outer position where the piston is at the first longitudinal / circular position of the chamber, and an inner position where the piston is at the second longitudinal / circular position of the chamber.

15. A pump according to claim 13 wherein the engaging means have an outer position where the piston is at the second longitudinal / circular position of the chamber, and an inner position where the piston is at the first longitudinal / circular position of the chamber.

16. A shock absorber comprising:

- a piston-chamber combination according to any of claims 1 to 11,
- a piston rod for engaging the piston of the piston-chamber combination from a position outside the chamber via an engaging means, wherein

the engaging means have an outer position where the piston is at the first longitudinal position of the chamber, and an inner position where the piston is at the second longitudinal position,

- said separate part (6,6') is sealingly engaging the wall (4) of said chamber (2), at least from a first and a second longitudinal / circular position of the chamber.

17. A shock absorber according to claim 16, further comprising a fluid entrance connected to the chamber and comprising a valve means.

18. A shock absorber according to claim 16 or 17 further comprising a fluid exit connected to the chamber and comprising a valve means.

19. A shock absorber according to any of claims 16 to 18 wherein the chamber and the piston form an at least substantially sealed cavity comprising a fluid, the fluid being compressed when the piston moves from the first to the second longitudinal / circular position of the chamber.

20. A shock absorber according to any of claims 16 to 18 further comprising means for biasing the piston toward the first longitudinal / circular position of the chamber.

21. An actuator comprising:

- a piston-chamber combination according to any of claims 1 to 12,
- a piston rod for engaging the piston of the piston-chamber combination from a position outside the chamber,
- means for introducing fluid into the chamber in order to displace the piston between the first and the second longitudinal / circular positions of the chamber,
- said separate part (6,6') is sealingly engaging the wall (4) of said chamber (2), from a second to the first longitudinal / circular position of the chamber or from the first to the second longitudinal / circular position of the chamber.

22. An actuator according to claim 21, further comprising a fluid entrance connected to the chamber and is comprising a valve means.

23. An actuator according to claim 21 or 22, further comprising a fluid exit connected to the chamber and is comprising a valve means.

24. An actuator according to any of claims 21 to 23 further comprising means for biasing the piston toward the first or second longitudinal / circular position of the chamber.

25. An actuator according to any of claims 21 to 24, wherein the introducing means comprise means for introducing pressurised fluid into the chamber.

26. An actuator according to any of claims 21 to 24 wherein the introducing means are adapted to introduce a combustible fluid, such as gasoline or diesel, into the chamber, and wherein the actuator further comprises means for combusting the combustible fluid.

27. An actuator according to any of claims 21 to 24 further comprising a crank, wherein said crank is adapted to translate the translation of the piston into a rotation of the crank.