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Bajonettzárral ellátott kombinált üzemi féki és rugóerő-tárolós féki fékhenger

Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

A fordítást a szabadalmas az 1995. évi XXXIII. törvény 84/H. §-a szerint nyújtotta be. A fordítás tartalmi helyességét a Szellemi Tulajdon Nemzeti Hivatala nem vizsgálta.

Combined service brake cylinder and spring brake
cylinder having a bayonet coupling

Description

5

Prior art

The invention relates to a combined service brake and
spring brake cylinder for brake systems of vehicles, as
10 per the preamble of patent claim 1, and to a method for
producing the same, as per claim 8.

A generic combined service brake and spring brake
cylinder is known for example from DE 40 11 739 A1,
15 wherein the bayonet coupling between the spring brake
cylinder and the intermediate wall comprises a separate
bayonet ring which, by way of its radially inwardly
pointing bayonet segments, engages over both locking
elements of the spring brake cylinder and also locking
20 segments of the intermediate wall. Here, an annular
seal is arranged between the radially inner
circumferential surface of the end-side edge, which has
the locking elements, of the spring brake cylinder and
a radially inner circumferential surface of the annular
25 chamber, which annular seal seals off the pressure
chamber, which can be aerated and deaerated, with
respect to the environment. In this case, the annular
seal is held in a groove on the radially inner
circumferential surface of the annular chamber.

30

Object of the invention

By contrast, it is the object of the invention to
further develop a combined service brake and spring
35 brake cylinder of the type mentioned in the
introduction such that it ensures improved sealing of
the pressure chamber of the spring brake cylinder.

Said object is achieved by means of the features of claim 1. The coordinate claim 6 specifies a method for producing a combined service brake and spring brake cylinder of said type.

5

Disclosure of the invention

It is proposed that a recess be provided in the base of the annular chamber for the purpose of receiving at least one end section of the annular seal, and that face-side contact surfaces be provided on the locking segments of the spring brake cylinder for the purpose of abutting against the base-side abutment surface in the annular chamber, wherein at least the end section of the annular seal is clamped between the recess in the base of the annular chamber and the edge of the wall of the spring brake cylinder.

The method for producing the combined service brake and spring brake cylinder then comprises at least the following steps:

- a) positioning the annular seal on the radially inwardly pointing circumferential surface of the annular chamber and positioning the end section of the annular seal in the recess in the base of the annular chamber,
- b) inserting the end-side edge of the wall of the spring brake cylinder by translational movement into the annular chamber of the intermediate wall, with the locking segments being inserted into the corresponding recess segments, until the face-side contact surfaces of the locking segments of the spring brake cylinder come into contact with the associated base-side abutment surface of the annular chamber, with at least the end section of the annular seal being clamped between the recess in the base of the annular chamber and the end-

side edge of the wall of the spring brake cylinder,

- 5 c) rotating the spring brake cylinder and intermediate wall relative to one another such that the radially outwardly projecting locking elements of the spring brake cylinder engage in positively locking fashion behind the radially inwardly projecting locking elements of the intermediate wall within the annular chamber.

10

The recess in the base of the annular chamber permits centering of the annular seal in a defined position before the spring brake cylinder and intermediate wall are joined together. Said centering assists in achieving that the annular seal is not displaced out of its defined position as a result of the translational insertion of the edge of the wall of the spring brake cylinder during the locking of the bayonet coupling.

- 20 Furthermore, the abutment of the face-side contact surfaces on the locking segments of the spring brake cylinder against the abutment surface on the base of the annular chamber assists in achieving that the annular seal is not squeezed to an excessive extent, and thus damaged, during the translational insertion of the edge of the wall of the spring brake cylinder. A defined available space for the end section of the annular seal is thus predefined.

- 30 It is not least the case that the clamping of the annular seal defined by contact surfaces and abutment surface ensures a certain degree of compression of the annular seal, and thus improved sealing behavior.

- 35 It is particularly preferable if the contact surfaces of the locking segments of the spring brake cylinder extend over the entire segment arc and, being formed as axial recesses in a face surface of the edge of the

wall of the spring brake cylinder, have a spacing of 0.1 to 0.3 mm from said face surface. Said recesses, which are of small dimensions in the axial direction and on which the contact surfaces are formed, prevent
5 the edge of the wall from protruding to an excessively great extent into the annular chamber and thus prevent excessive clamping of and damage to the annular seal.

It is furthermore preferable if the contact surfaces of
10 the locking segments of the spring brake cylinder, measured with a spacing of 2.1 mm to 2.3 mm from the radially inwardly pointing circumferential surface of the edge of the wall of the spring brake cylinder, extend to the radially outwardly pointing
15 circumferential surface of the locking segments.

It is preferable here if the base-side abutment surface in the annular chamber for the contact surfaces of the locking segments of the spring brake cylinder is
20 arranged radially to the outside of the recess in the base of the annular chamber for the annular seal.

It is particularly preferable if the annular chamber is formed integrally with the intermediate wall. It is
25 then possible to dispense with the production of a bayonet ring as in DE 40 11 739 A1, which simplifies the production of the combined service brake and spring brake cylinder.

30 In one refinement, the annular seal is of bone-like form in cross section, with end sections of bead-like form and with a central section narrowed in relation to said end sections. The other end section of the annular seal is then clamped elastically in the radial
35 direction between a radially inwardly pointing circumferential surface of the edge of the wall of the spring brake cylinder and a radially outwardly pointing circumferential surface of the annular chamber of the

intermediate wall. This ensures a sealing action and a force fit which prevents release of the bayonet coupling.

5 Drawings

The invention will be presented by way of example below on the basis of the drawing, in which:

10 figure 1 is a cross-sectional illustration of a combined service brake and spring brake cylinder according to a preferred embodiment;

15 figure 2 is a perspective illustration of the combined service brake and spring brake cylinder of figure 1 during the assembly of a bayonet coupling;

20 figure 3 is a cross-sectional illustration of the bayonet coupling;

figure 4 is a cross-sectional illustration of an edge of the wall of the spring brake cylinder with locking segments of the bayonet coupling.

25

Description of the exemplary embodiment

30 In the following description of the exemplary embodiments, identical or functionally identical components and assemblies are denoted by the same reference signs.

35 For the explanation of the invention by way of an example, figure 1 of the drawing illustrates a combined service brake and spring brake cylinder, referred to hereinafter as combination cylinder 1. The combination cylinder 1 is composed of a service brake cylinder 3 and of a spring brake cylinder 5 connected structurally

and functionally to said service brake cylinder; the service brake cylinder and the spring brake cylinder are separated from one another by an intermediate wall 7. A piston 9 is displaceably arranged within the spring brake cylinder, wherein an accumulator spring 11 bears against one side of the piston 9. At its opposite side, the accumulator spring 11 is supported against the base 13 of the spring brake cylinder 5. Into the pressure chamber 15 situated to the left of the piston 9 in figure 1 there issues an inlet (not illustrated) through which compressed air is introduced in order to displace the piston 9 to the right, so as to brace the accumulator spring 11. During said displacement of the piston, the air that is situated within the spring chamber 17 that accommodates the accumulator spring is pushed out for example via a check valve (not illustrated). If, by contrast, for braking purposes, the pressure in the pressure chamber 15 of the spring brake cylinder is released upon the actuation of a valve, such as is known per se, connected to the inlet of the pressure chamber, then the accumulator spring 11 can displace the piston 9 to the left in the illustration in figure 1. The piston 9 is connected to a piston rod 19 which extends through the intermediate wall 7 into the region of the pressure chamber 21 of the service brake cylinder 3. A seal 23 located in the intermediate wall seals against the outer wall of the piston rod during the longitudinal movements of the latter. Into the pressure chamber 21 there issues an inlet 24 via which compressed air is admitted for the actuation of the service brake cylinder. The compressed air acts on the diaphragm 25 located within the service brake cylinder 3, on the opposite side of which diaphragm there is provided a thrust piece in the form of a diaphragm plate 27. The diaphragm plate 27 is connected to a thrust rod 29 which extends out of the chamber 30, situated to the left of the diaphragm 25, of the service brake cylinder and interacts (in a way

which is not illustrated) with a brake actuating mechanism outside the combination cylinder 1. Said brake actuating mechanism may for example refer to the actuating parts of a disk brake of a motor vehicle. The
5 wall 31 of the spring brake cylinder 5 is preferably composed of steel or aluminum.

For the releasable connection of the spring brake cylinder 5 to the intermediate wall 7, a bayonet
10 coupling 33 is provided which is shown in figure 2 and figure 3. The bayonet coupling 33 has, on an end-side edge 35 of the wall 31 of the spring brake cylinder 5, radially outwardly projecting locking segments 37 and radially inwardly molded recess segments 39 and has,
15 formed correspondingly to these on an annular chamber 43 which is formed on the end-side edge 41 of the intermediate wall 7, radially outwardly molded recess segments 45 and locking segments 47 which project radially inward into the annular chamber 43. It is
20 preferable here for locking segments 37, 47 and recess segments 39, 45 to alternate over the circumference in each case without gaps and to each have the same segment arc length. The locking segments 37 and the recess segments 39 of the spring brake cylinder 5 are
25 preferably arranged directly on the end-side edge 35 of the wall 31, and in the same way, the locking segments 47 and the recess segments 45 of the intermediate wall 7 are arranged directly on the edge 41 thereof.

30 Furthermore, a base-side abutment surface 49 in the annular chamber 43 acts as an axial abutment for contact surfaces 50 of the locking segments 37 on the end-side edge 35 of the wall 31 of the spring brake cylinder 5 when said edge 35 is inserted by
35 translational movement into the annular chamber 35, as will be described in more detail further below.

For sealing off the pressure chamber 15 with respect to the environment, an annular seal 55 is provided which is arranged between the radially inwardly pointing circumferential surface 51 of the edge 35 of the wall 31 of the spring brake cylinder 5 and the radially outwardly pointing circumferential surface 53 of the annular chamber 43, as can be seen in particular in figure 3. The annular seal 55 is in particular in the form of a cylindrical ring section.

10

It is particularly preferable for the annular chamber 43 to be formed integrally with the edge 41 of the intermediate wall 7 and to be in the form of an annular notch, on the face side in the axial direction, in the end-side edge 41, which points towards the edge 35 of the wall 31 of the spring brake cylinder 5, of the intermediate wall 7. On the base 59 of the annular chamber 43 there is formed a radially inner, annular recess 61. Here, the base-side abutment surface 49 in the annular chamber 43 is arranged radially to the outside of the recess 61 in the base 59 of the annular chamber 43 for the annular seal 55.

As can be seen in particular from figure 4, the contact surfaces 50 of the locking segments 37 of the spring brake cylinder 5 extend in each case over the entire segment arc length thereof and, being formed as axial recesses in a face surface 57 of the edge 35 of the wall 31 of the spring brake cylinder 5, have a spacing of 0.1 to 0.3 mm (0.3 mm by way of example in figure 4) from said face surface. Furthermore, the contact surfaces 50 of the locking segments 37 of the spring brake cylinder 5, measured with a spacing of 2.1 mm to 2.3 mm (2.3 mm by way of example in figure 4) from the radially inwardly pointing circumferential surface 51 of the edge 35 of the wall 31 of the spring brake cylinder 5, extend to the radially outwardly pointing circumferential surface 63 of the locking segments 37.

It is provided not least that the length of the locking segments as seen in the axial direction is approximately 9.8 mm. In a further embodiment (not shown here), the face surface 57 of the edge 35 of the wall 31 does not have a recess, and then itself forms the contact surface 50 by way of a radially outer section.

The annular seal 55 is of bone-like form in cross section, with end sections 65 and 71 of bead-like form and with a central section 69 narrowed in relation to said end sections.

Against this background, proceeding from the initial state shown in figure 2 in which the intermediate wall 7 is oriented coaxially with the spring brake cylinder 5, the bayonet coupling 33 is locked or closed as follows: firstly, the annular seal 55 is positioned on the radially inwardly pointing circumferential surface 53 of the annular chamber 43, and in particular, the end section 65 of said annular seal is positioned in the recess 61 in the base 59 of the annular chamber 43. For this purpose, the annular seal 55 or the end section 65 thereof is provided with a corresponding inner diameter. The end-side edge 35 of the wall 31 of the spring brake cylinder 5 is then inserted by translational movement into the annular chamber 43 of the intermediate wall 7, as indicated in figure 2 by the arrow 1.

In the process, the locking segments 37 of the spring brake cylinder 5 are inserted into the corresponding recess segments 45 of the intermediate wall, and the locking segments 47 of the intermediate wall 7 are inserted into the corresponding recess segments 39 of the spring brake cylinder 5, by translational movement, that is to say coaxially with the central axis 67 of the combination cylinder 1, until the face-side contact

surfaces 50 of the locking segments 37 of the spring brake cylinder 5 come into contact with the associated base-side abutment surface 49 of the annular chamber 43. In the process, the end section 65 of the annular seal 55 is clamped axially between the recess 61 in the base 59 of the annular chamber 43 and the face surface 57 of the end-side edge 35 of the wall 31 of the spring brake cylinder 5. Here, however, for the end section 65 of the annular seal 55, an axial space remains between the recess 61 in the base 59 of the annular chamber 43 and the face surface 57 of the end-side edge 35 of the wall 31 of the spring brake cylinder 5 which is sufficient to prevent said end section from being displaced out of the desired position shown in figure 3 or damaged.

On the other hand, however, the other end section 71, which points away from the base 59 of the annular chamber 43, of the annular seal 55 is in the process compressed elastically in the radial direction and clamped between the radially inwardly pointing circumferential surface 51 of the edge 35 of the wall 31 of the spring brake cylinder 5 and the radially outwardly pointing circumferential surface 53 of the annular chamber 43 of the intermediate wall 7.

Finally, as per the arrow 2 in figure 2, the spring brake cylinder 5 and intermediate wall 7 are rotated relative to one another such that the radially outwardly projecting locking segments 37 of the spring brake cylinder 5 engage in positively locking fashion behind the radially inwardly projecting locking segments 47 of the intermediate wall 7 within the annular chamber 43. In the process, or subsequently, the edge 37 of the spring brake cylinder deflects out of the annular chamber 43 slightly in the axial direction owing to the elastic spring forces of the axially clamped and compressed end section 65 of the

annular seal 55, such that, in the locked state of the bayonet coupling 33, the contact surfaces 50 of the locking segments 37 of the spring brake cylinder 5 are spaced apart axially slightly from the abutment surface 49 on the base 59 of the annular chamber 43, and the positive locking action between the locking segments 37, 47 can be generated and/or maintained. The bayonet coupling 33 thus remains in a stressed state. Furthermore, unlocking of the bayonet coupling is prevented by means of two securing pins (not shown here). Said state is shown in figure 3. The bayonet coupling 33 is thus locked.

The elastic compression of the annular seal 55 in the radial direction between the radially inwardly pointing circumferential surface 51 of the edge 35 of the wall 31 of the spring brake cylinder 5 and the radially outwardly pointing circumferential surface 53 of the annular chamber 43 of the intermediate wall 7 serves on the other hand to generate a sealing action and a force fit which prevents a release of the bayonet coupling 33, as is easily conceivable from figure 3.

List of reference numerals

	1	Combination cylinder
	3	Service brake cylinder
5	5	Spring brake cylinder
	7	Intermediate wall
	9	Piston
	11	Accumulator spring
	13	Base
10	15	Pressure chamber
	17	Spring chamber
	19	Piston rod
	21	Pressure chamber
	23	Seal
15	24	Inlet
	25	Diaphragm
	27	Diaphragm plate
	29	Thrust rod
	30	Chamber
20	31	Wall
	33	Bayonet coupling
	35	Edge
	37	Locking segments
	39	Recess segments
25	41	Edge
	43	Annular chamber
	45	Recess segments
	47	Locking segments
	49	Abutment surface
30	50	Contact surfaces
	51	Circumferential surface
	53	Circumferential surface
	55	Annular seal
	57	Face surface
35	59	Base
	61	Recess
	63	Circumferential surface
	65	End section

67 Central axis
69 Central section
71 End section

BAJONETTZÁRRAL ELLÁTOTT KOMBINÁLT ÜZEMI FÉKI ÉS RUGÓERŐ- TÁROLÓS FÉKI FÉKHENGER

SZABADALMI IGÉNYPONTOK

1. Kombinált üzemi féki és rugóerő-tárolós féki fékhenger (1) járművek, főleg haszonjarművek fékberendezéséhez, amely magában foglal

a) egy üzemi féki dugattyút vagy üzemi féki membránt (25, 27), amely az üzemi féki fékhengerben (3) van elhelyezve, és nyomóközeggel működtethető, és amely működtető kapcsolatban áll egy, az üzemi féki fékhengerből (3) kinyúló, és fékműködtető elemekre ható üzemi féki dugattyúruddal (29),

b) egy rugóerő-tárolós féki dugattyút (9), ami a rugóerő-tárolós féki fékhengerben (5) van elhelyezve, és tárolórugóval (11) működtethető, és amit egyik oldalon egy nyomókamra (15), az ellentétes oldalon pedig a tárolórugót (11) befogadó rugókamra (17) határol, amely tárolórugó (11) egyfelől a rugóerő-tárolós féki dugattyúra (9), másfelől a rugóerő-tárolós féki fékhenger (5) fenekére (13) támaszkodik,

c) egy közfalat (7) az üzemi féki fékhenger (3) és a rugóerő-tárolós féki fékhenger (5) között, amin átmegy egy rugóerő-tárolós féki dugattyúrud (19), amely össze van kapcsolva a rugóerő-tárolós féki dugattyúval (9),

d) egy bajonettzár (33) a rugóerő-tárolós féki fékhenger (5) és a közfal (7) között, amely a rugóerő-tárolós féki fékhenger (5) falának (31) végoldali peremén (35) sugárirányban kifelé előreálló reteszelszegmensekkel (37) és sugárirányban befelé kiformált mélyedésszegmensekkel (39), valamint ezeknek megfelelő, a közfallyal (7) összekötött gyűrűkamrán (43) kialakított, sugárirányban kifelé kiformált mélyedésszegmensekkel (45) és a gyűrűkamrába (43) sugárirányban befelé előreálló reteszelszegmensekkel (47) van ellátva,

e) a gyűrűkamrában (43) egy fenékdoldali ütközőfelületet (49), ami a rugóerő-tárolós féki fékhenger (5) falának (31) végoldali pereme (35) számára tengelyirányú ütközőként szolgál,

f) egy gyűrűtömítést (55), ami rugóerő-tárolós féki fékhenger (5) fala (31) peremének (35) sugárirányban befelé néző palástfelülete (51) és a gyűrűkamra (43) sugárirányban kifelé néző palástfelülete (53) között van elhelyezve, **azzal jellemezve**, hogy

g) a gyűrűkamra (43) fenekében (59) egy mélyedés (61) van a gyűrűtömítés (43) legalább egyik végszakaszának (65) befogadására, valamint

h) a rugóerő-tárolós féki fékhenger (5) reteszelőszegeimensein (37) homlokoldali érintkezési felületek (50) vannak a gyűrűkamrában (43) lévő fenékoldali ütközőfelületen (49) való felütközésre, továbbá

i) a gyűrűtömítésnek (55) legalább a végszakasza (65) be van szorítva a gyűrűkamra (43) fenekében (59) lévő mélyedés (61) és a rugóerő-tárolós féki fékhenger (5) falának (31) pereme (35) közé.

2. Az 1. igénypont szerinti kombinált üzemi féki és rugóerő-tárolós féki fékhenger, **azzal jellemezve**, hogy a rugóerő-tárolós féki fékhenger (5) reteszelőszegeimenseinek (37) érintkezési felületei (50) a teljes szegeimensívre kiterjednek, és a rugóerő-tárolós féki fékhenger (5) fala (31) végoldali peremének (35) homlokfelületében (57) kialakított tengelyirányú mélyedéseként a homlokfelülettől 0,1 és 0,3 mm közötti távolságra vannak.

3. A 2. igénypont szerinti kombinált üzemi féki és rugóerő-tárolós féki fékhenger, **azzal jellemezve**, hogy a rugóerő-tárolós féki fékhenger (5) reteszelőszegeimenseinek (37) érintkezési felületei (50) a rugóerő-tárolós féki fékhenger (5) fala (31) peremének (35) sugárirányban befelé néző palástfelületétől (51) mért 2,1 mm és 2,3 mm közötti távolságra kezdődnek, és a reteszelőszegeimensek (37) sugárirányban kifelé néző palástfelületéig (63) terjednek.

4. Az előző igénypontok egyike szerinti kombinált üzemi féki és rugóerő-tárolós féki fékhenger, **azzal jellemezve**, hogy a gyűrűkamrában (43) lévő fenékoldali ütközőfelület (49) a gyűrűkamra (43) fenekében (59) lévő mélyedéshez (61) képest sugárirányban kívül van elhelyezve, illetve ahhoz sugárirányban kívül csatlakozik.

5. Az előző igénypontok egyike szerinti kombinált üzemi féki és rugóerő-tárolós féki fékhenger, **azzal jellemezve**, hogy a gyűrűkamra (43) a közfallal (7) egy darabban van kialakítva.

6. Az előző igénypontok egyike szerinti kombinált üzemi féki és rugóerő-tárolós féki fékhenger, **azzal jellemezve**, hogy a gyűrűtömítés (55) keresztmetszetben csont alakúra van kialakítva, és így gömbszerűen kialakított végszakaszokkal (65, 71), valamint azokhoz képest beszűkített középső szakasszal (69) rendelkezik.

7. A 6. igénypont szerinti kombinált üzemi féki és rugóerő-tárolós féki fékhenger, **azzal jellemezve**, hogy a gyűrűtömítésnek (55) a másik végszakasza (71) sugárirányban rugalmasan be van szorítva a rugóerő-tárolós féki fékhenger (5) fala (31) peremének (35) sugárirányban befelé néző palástfelülete (51) és a közfal (7) gyűrűkamrájának (43) sugárirányban kifelé néző palástfelülete (53) közé.

8. Eljárás az előző igénypontok egyike szerinti kombinált üzemi féki és rugóerő-tárolós féki fékhenger (1) előállítására, amely a következő lépésekből áll:

a) a gyűrűtömítést (55) a gyűrűkamra (43) sugárirányban befelé néző palástfelületénél (53) és a gyűrűtömítés (55) végszakaszát (65) a gyűrűkamra (43) fenékében (59) lévő mélyedésben (61) pozicionáljuk,

b) a rugóerő-tárolós féki fékhenger (5) falának (31) végoldali peremét (35) translációsan bevezetjük a közfal (7) gyűrűkamrájába (43), miközben a reteszelőszegmenseket (37, 47) bevezetjük a megfelelő mélyedésszegmensekbe (39, 45) egészen addig, amíg a rugóerő-tárolós féki fékhenger (5) reteszelőszegmenseinek (37) homlokoldali érintkezési felületei (50) érintkezésbe nem kerülnek a gyűrűkamra (43) hozzájuk rendelt fenékoldali ütközőfelületével (49), és a gyűrűtömítésnek (55) legalább a végszakaszát (65) beszorítjuk a gyűrűkamra (43) fenékében (59) lévő mélyedés (61) és a rugóerő-tárolós féki fékhenger (5) falának (31) végoldali pereme (35) közé,

c) a rugóerő-tárolós féki fékhengert (5) és a közfalat (7) egymáshoz képest elforgatjuk olyan módon, hogy a rugóerő-tárolós féki fékhenger (5) sugárirányban kifelé előreálló reteszelőelemei (37) a gyűrűkamrán (43) belül alakzáróan a közfal (7) sugárirányban befelé előreálló reteszelőelemei (47) mögé fognak.

A meghatalmazott:

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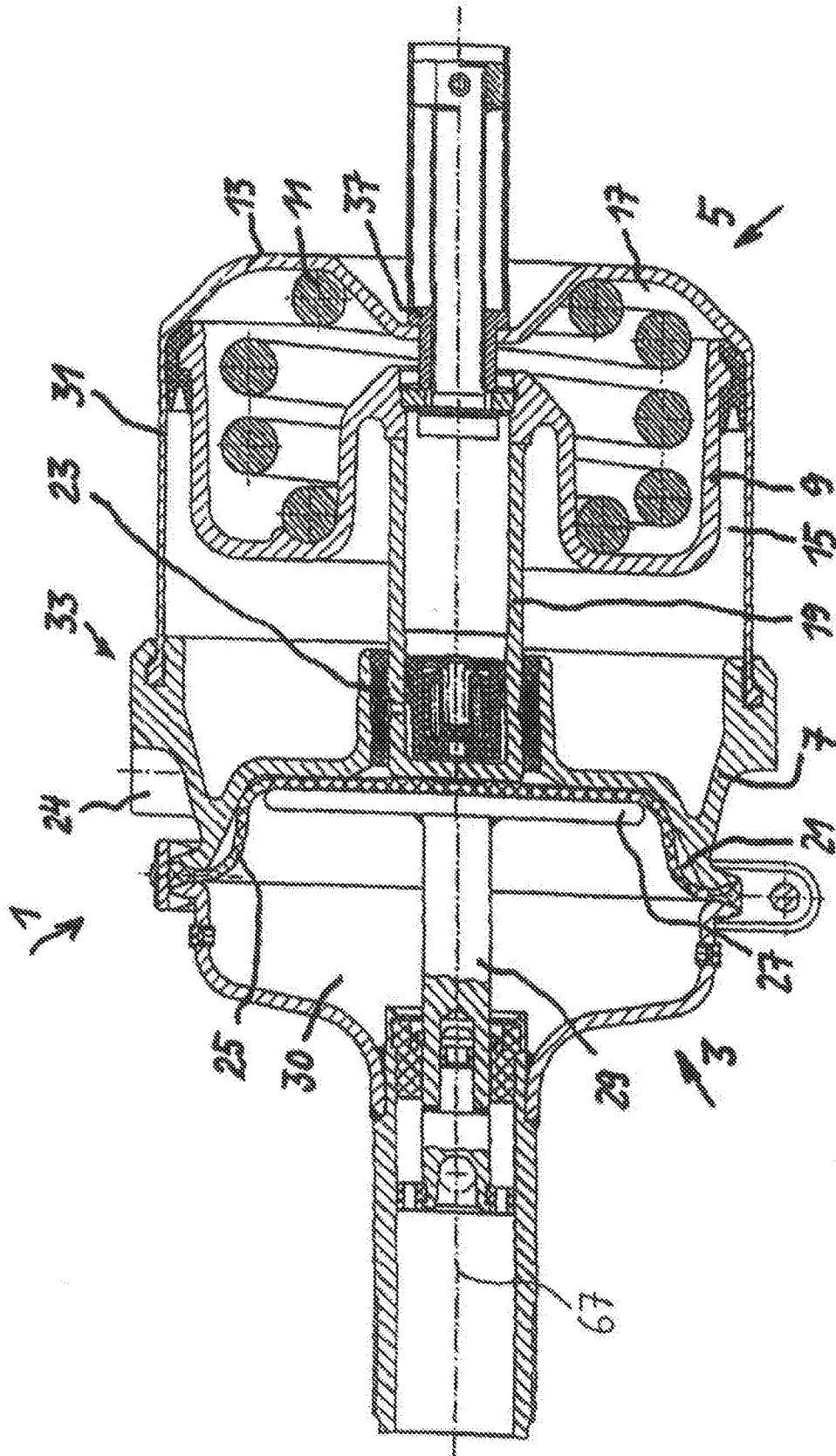


FIG1

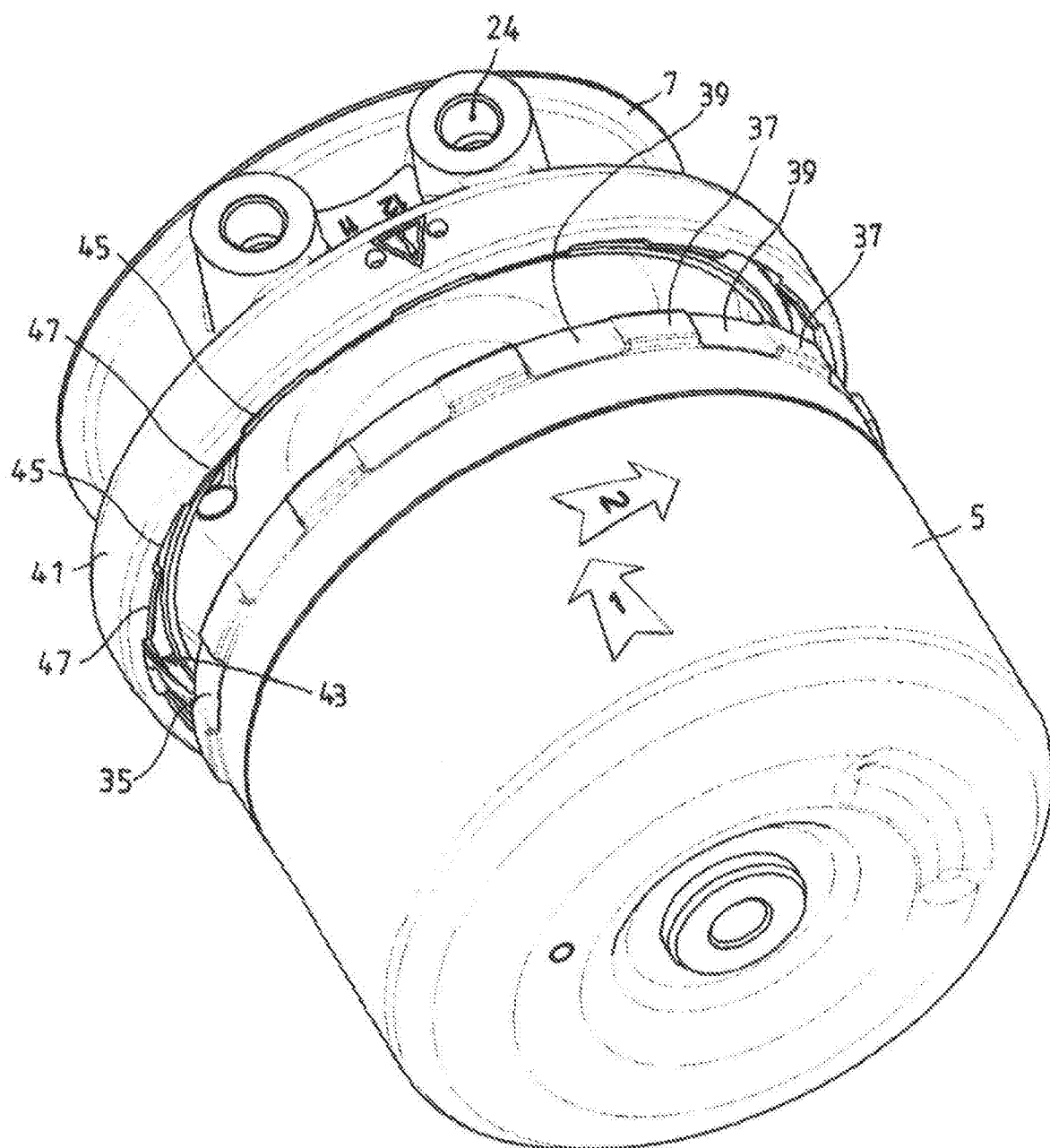


FIG.2

