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(54) **Distributing system for a piston hydraulic engine**

Verteilervorrichtung für einen hydraulischen Radialkolbenmotor

Système distributeur pour un moteur hydraulique à piston radial

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Description

[0001] The present invention refers to a distribution system for a piston hydraulic engine, in particularly for an engine with a rotating piston block, said engine comprising a distribution body with distribution channels, and a block with pistons and feeding channels arranged coaxially to the distribution body.

[0002] A distributor with hydraulic engines is common for all pistons, therefore, the piston position must alternate with regard to the distributor, or vice versa. The circular distributor is placed coaxially with the engine axis where it rotates, whereas the piston block remains stationary. Such a solution is disclosed in DE 19 653 591 C1. The drawback of said solution is wear and tear of the mutually cooperating distributor surfaces, resulting in an increased gap and leakage between channels and from the distributor into the housing, which increases with the power of three of the gap width. In addition, said solution does not provide a hollow shaft design of a hydraulic engine.

[0003] Another solution is disclosed in US 4,522,110. The latter comprises distribution plates being associated in a pressure-tight manner with the facing ends of a distribution body and piston block, respectively. The body and the piston block comprise distribution channels. At the inner end of each distribution channel in the body, there is a bore in which there is mounted an annular spacer which is pressed against the distribution plate by spring and by the pressure medium acting on the inner end surface of said spacer. In order to achieve an unobstructed axial movement of the annular spacer in said bore, a solution requires fine machining of the bore for the annular spacer and spring, respectively. Fine machining is also required in order to achieve a smooth axial movement of the distribution plate within the seat thereof in the facing end of the body where the distribution plate is mounted.

[0004] A hydraulic engine comprising a distributor is known from the publication of the patent application DE 44 05 123. With said solution the separation of the sliding surfaces is solved by means of different combinations of contact, sealing, and resilient elements by means of which the fluid pressure is also applied to the rear of the distributor. A constantly moving gap is achieved therewith, while the stationary gap increases due to wear, resulting in the seals preloading.

[0005] It is the object of the present invention to create a distribution system for a piston hydraulic engine that is easily maintained, and simultaneously the hydraulic engine will attain, with the minimal weight and size, relatively high pressures and revolutions with the same hydraulic losses of the distribution system.

[0006] According to the invention the object as set above is solved by a distribution system in accordance to claim 1, in that on the facing ends of the distribution body and the piston block, respectively, annular spacers are inserted in a pressure-tight manner into each mouth of the distribution channels and feeding channels, respectively. Said annular spacers being provided, equally radially spaced, in the distribution body and piston block, respectively. In order to prevent any movement of said annular spacers, they being covered and held by means of an annular distribution plate being associated in a pressure-tight manner with the distribution body and piston block, respectively In addition, the distribution body is formed on its opposite end with a plurality of radially spaced blind holes wherein compression springs are arranged which are loaded in the axial direction by means of a pressure plate attached to the housing.

[0007] According to the present invention, such an embodiment of the distribution system is possible, that on the facing ends of the distribution body and the piston block, respectively, annular spacers are inserted in a pressure-tight manner into each mouth of the distribution channels being provided, equally radially spaced, in the distribution body and piston block, respectively, said annular spacers being covered and held by means of an annular distribution plate. The latter is associated in a pressure-tight manner with the distribution body and piston block, respectively, and projects in an axial direction, when installed, above the surface of the distribution body and the piston block, respectively. Each distribution plate is formed with distribution apertures, the radial position thereof is equal to the radial position of the annular spacers in the mouth of each distribution channels. The outline of each distribution aperture, at least in one of the distribution plates, is selected to be a circle, square, rectangle or trapezium, preferably an annular segment.

[0008] It has been proven that if one of the distribution plates, preferably the distribution plate being associated with the distribution body, is made of a wear-resistant material. During operation of the hydraulic engine the pistons and the piston block therewith wears more than the distribution body. Therefore, it has been proven that when the piston block has sufficient wear and requires replacing, the less resistant distribution plate attached to the piston block is replaced simultaneously.

[0009] The distribution plates and the annular spacers are connected in a pressure-tight manner both mutually as well as with the distribution body and the piston block, respectively. Connection can be completed by means of soldering, gluing or similar. Both the distribution plates as well as the annular spacers can be manufactured by means of punching, sintering, die casting or similar convenient method.

[0010] Another embodiment of the distribution system is possible according to the present invention, where only distribution plates are employed, without annular spacers.

[0011] The present invention will become more fully understood from the detailed description given hereinafter and the accompanying drawings, wherein

Fig. 1 shows a cross-section of a distributor of a hydraulic engine;

Fig. 2 shows the distributor viewed in the direction of the arrow II of Fig. 1;
Fig. 3 shows a cross-section along the line III-III of the distributor of Fig. 1; and
Fig. 4 shows piston block viewed in the direction of the arrow IV of Fig. 1.

[0012] A piston hydraulic engine according to the invention consist of a two-part housing 1a,1b joined face to face and a cam ring 2 arranged between the two halves of the housing 1a, 1b, where each contact surface between the housing and the cam ring 2 is appropriately sealed against leakage of hydraulic fluid. A cylindrical distribution body 3 is arranged in the first half of the housing 1a, said body 3 being in a manner known per se separated from the housing 1a by means of a plurality of sealing elements 4. Said housing 1a is formed on the inner surface thereof being in contact with the distribution body 3 with annular chambers 5, 6 intended for feeding and discharge, respectively, hydraulic fluid, said chambers being arranged between each pair of the sealing elements 4. In a given case, the first chamber 5 is a high-pressure feeding chamber, while the second chamber 6 is a low-pressure discharge chamber. If it is required to change the direction of rotation, the pressure only needs to be switched in each of the chambers, so that the high-pressure chamber becomes the low-pressure chamber and vice versa. The distribution body 3 is secured against rotation relatively to the housing 1a in a manner known per se and therefore not shown in detail.

[0013] The distribution body 3 is in its radial edge area and on the side facing the piston block formed with a plurality of distribution channels 7, 7' being equally spaced on the circumference of said body and extending parallel to the axis of the body 3, said channels being alternately connected to the high-pressure feeding chamber 5 and the low-pressure discharge chamber 6 provided in the housing 1a of the hydraulic engine. Said connection of the channels and annular chambers is carried out by means of transversal channels 8, 8'. The total number of said channels is always even and corresponds to double the cam lobes of the cam ring 2, said lobes cooperate with the pistons of the hydraulic engine. The discharge portion of each distribution channel 7, 7' facing the piston block is closed with an annular spacer 9 comprising a through-hole 9', the outline thereof on the feeding side, i.e. the side facing each channel, is adapted to the outline of the channel 7, 7', while the outline of the through-hole 9' on the discharge side, i.e. the side averted from each channel, is selected in a manner that the coefficient of the fluid resistance is as low as possible. The outline of the through-hole 9' on the discharge side can be a circle, a square, a rectangle or a trapezium, preferably an annular segment, as it is shown in Fig. 2, Fig. 3 and Fig. 4. The annular spacers 9 are covered and held with an annular distribution plate 10 associated with the distribution body 3 and, when installed, projecting in an axial direction above the surface of the body 3. Said distribution plate 10 is formed with distribution apertures 11 the radial position thereof is equal to the radial position of the through-hole 9' of each annular spacer 9, where the outline of each distribution aperture 11 is identical to the outline of the through-hole 9' at the discharge side of each annular spacer 9, so that the through-holes 9' and the distribution apertures 11 entirely coincide. The distribution body 3 is formed on its opposite end with a plurality of radially spaced blind holes wherein compression springs 12 are arranged. The latter are loaded in the axial direction by means of a pressure plate 13 attached to the housing 1a.

[0014] Furthermore, inside said two-part housing 1a, 1b, in the area under the cam ring 2, there is a piston block 14 arranged coaxially with the distribution body 3 in which is arranged a plurality of pistons 15 being movable in a radial direction. Here, each piston 15 is continuously in contact with the cam ring 2 via a roller 16. The piston block 14 on the side facing the distribution body 3 is provided with a plurality of feeding channels 17 equally spaced on the circumference of said body and parallel to the axis of piston block 14, said channels being located at the same radial distance as are the channels 7, 7' in the distribution body 3. The number of the feeding channels 17 equals the number of the pistons 15 in the block 14. The portion of each channel 17 facing the distribution body 3 ends in an annular spacer 18 comprising a through-hole 18' the outline thereof at the discharging side, i.e. the side being averted from each channel, is adapted to the outline of the channel 17, while the outline of the through-hole 18' at the feeding side thereof, i.e. the side facing each channel, is selected in a manner that the coefficient of the fluid resistance is as low as possible. The outline of said through-hole on the feeding side can be a circle, a square, a rectangle or a trapezium, preferably an annular segment, as it is provided with the through-holes 9' in the annular spacers 9 in the distribution body 3. The annular spacers 18 are covered and held by means of a distribution plate 19 being associated with the piston block 14 and projecting, when installed, in an axial direction above the surface of the block 14. Said distribution plate 19 is formed with distribution apertures 20 the radial position thereof equaling the radial position of the through-hole 18' of each annular spacer 18, the outline of each distribution aperture 20 is identical to the outline of the through-hole 18' at the feeding side of each annular spacer 18, so that the through-holes 18' and the distribution apertures 20 entirely coincide.

[0015] The above mentioned pressure plate 13 which presses a plurality of springs arranged in the distribution body 3 continuously provides load in the axial direction of the hydraulic engine resulting in the distribution plate 10 on the distribution body 3 being permanently pressed against the distribution plate 19 on the piston block 14, regardless of the wear and tear of the two distribution plates or the pressure of the hydraulic fluid.

[0016] According to the present invention, the distribution plates 10, 19 as well as the apertures 11, 20 could

be produced by means of punching, sintering, or die casting, depending on the material used, since the present invention facilitates the use of arbitrary materials. Another embodiment of the distribution system is possible according to the present invention, where only distribution plates are employed, without annular spacers. Dimensions of the distribution apertures in each distribution plate can be optionally modified and the same applies to the channels. Such embodiment allows an increase in the allowable rotational frequency and decreasing of the hydraulic loss, respectively. As a rule, the distribution plate which is less resistant against the wear and tear is installed on the piston block, thus it can be replaced quickly and simply, if necessary, together with the piston block.

Claims

1. A distribution system for a piston hydraulic engine, in particularly for an engine with a rotating piston block, said engine comprising distribution body with distribution channels, and a block with pistons and feeding channels arranged coaxially to the distribution body, distribution plates are associated in a pressure-tight manner with the facing ends of a distribution body and a piston block, respectively, said distribution plates, when installed, project in an axial direction above the surface of the distribution body and the piston block, respectively, where both distribution plates are formed with distribution apertures, the radial position of said distribution apertures equals the radial position of distribution channels in the distribution body and to the radial position of feeding channels in the piston block, respectively, and where the distribution apertures coincide with the distribution channels and the feeding channels, respectively, where the outline of each distribution aperture in at least one of the distribution plates (10, 19), is selected to be a circle, square, rectangle or trapezium, preferably an annular segment ***characterised in that*** on the facing ends of the distribution body (3) and the piston block (14), respectively, annular spacers (9; 18) are inserted in a pressure-tight manner into each mouth of the distribution channels (7, 7') and feeding channels (17), respectively, being provided, equally radially spaced, in the distribution body (3) and piston block (14), respectively, said annular spacers (9; 18) being covered and held by means of an annular distribution plate (10; 19) being associated in a pressure-tight manner with the distribution body (3) and piston block (14), respectively, and projects in axial direction, when installed, above the surface of the distribution body (3) and the piston block (14), respectively, and that the distribution body (3) is formed on its opposite end with a plurality of radially spaced blind holes wherein compression springs (12) are arranged which are loaded in the axial direction by means of a pressure plate (13) attached to the housing (1a).

2. A distribution system for a piston hydraulic engine according to claim 1, ***characterised in that*** one of the distribution plates (10; 19), preferably the distribution plate (10) being associated with the distribution body (3), is made of a material being more resistant against wear and tear than the distribution plate (19) being associated with the piston block (14).

3. A distribution system for a piston hydraulic engine according to claims 1 and *2,* ***characterised in that*** each annular spacer (9) associated with the distribution body (3) comprises a through-hole (9') the outline thereof at the feeding side is adapted to the outline of each distribution channel (7, 7') in the distribution body (3), and that each annular spacer (18) associated with the piston block (14) comprises a through-hole (18') the outline thereof at the discharge side is adapted to the outline of the feeding channel (17) in the piston block (14).

4. A distribution system for a piston hydraulic engine according to any of claims 1 to 3, ***characterised in that*** the outline of the through-hole (9') in the annular spacer (9) at the discharge side and that the outline of the through-hole (18) in the annular spacer (18) at the feeding side are adapted to the outline of the apertures in each of the distribution plates (10, 19).

5. A distribution system for a piston hydraulic engine according to any of claims 1 to 4, ***characterised in that*** the distribution plate (10) is formed with distribution apertures (11) the radial position thereof is equal to the radial position of the through-hole (9') of each annular spacer (9), where the outline of each through-hole (9') at the discharge side of each annular spacer (9) is identical to the outline of the distribution aperture (11), so that the through-holes (9') of the annular spacer (9) and of the distribution aperture (11) of the plate (10) entirely coincide.

6. A distribution system for a piston hydraulic engine according to any of claims 1 to 5, ***characterised in that*** the distribution plate (19) is formed with distribution apertures (20) the radial position thereof is equal to the radial position of the through-hole (18') of each annular spacer (18), where the outline of each through-hole (18') at the feeding side of each annular spacer (18) is identical to the outline of the distribution aperture (20), so that the through-holes (18') of the annular spacer (18) and of the distribution aperture (20) of the plate (19) entirely coincide.

7. A distribution system for a piston hydraulic engine according to any of claims 1 to 6, ***characterised in that*** the distribution plates (10; 19) are connected in

a pressure-tight manner to the distribution body (3) and the piston block (14), respectively, by means of gluing, soldering and similar.

8. A distribution system for a piston hydraulic engine according to any of claims 1 to 7, ***characterised in that*** the the annular spacers (9; 18) are connected in a pressure-tight manner with the distribution body (3) and piston block (14), respectively, as well as with the distribution plate (10; 19), by means of gluing, soldering and similar.

Patentansprüche

1. Verteilungssystem für einen hydraulischen Kolbenmotor, insbesondere für einen Motor mit einem rotierenden Kolbenblock, wobei dieser Motor umfasst: einen Verteilungskörper mit Verteilungskanälen und einen Block mit Kolben und Zuführungskanälen, die koaxial zu dem Verteilungskörper angeordnet sind, wobei Verteilungsplatten in einer druckdichten Weise jeweils mit den Stirnenden eines Verteilungskörpers und eines Kolbenblocks verbunden sind, wobei die Verteilungsplatten, wenn sie installiert sind, jeweils in eine axiale Richtung über die Oberfläche des Verteilungskörpers und des Kolbenblocks vorstehen, wobei beide Verteilungsplatten mit Verteilungsöffnungen ausgebildet sind, die radiale Position der Verteilungsöffnungen jeweils der radialen Position der Verteilungskanäle in dem Verteilungskörper und der radialen Position der Zuführungskanäle in dem Kolbenblock gleicht und wobei die Verteilungsöffnungen jeweils mit den Verteilungskanälen und den Zuführungskanälen zusammenfallen, wobei der Umriss jeder Verteilungsöffnung in wenigstens einer der Verteilungsplatten (10, 19) derart ausgewählt ist, dass er ein Kreis, ein Quadrat, ein Rechteck, ein Trapez, bevorzugt ein ringförmiger Abschnitt ist, **dadurch gekennzeichnet, dass** auf den Stirnenden des Verteilungskörpers (3) und des Kolbenblocks jeweils ringförmige Abstandshalter (9; 18) in einer luftdichten Weise jeweils in jede Mündung der Verteilungskanäle (7, 7') und der Zuführungskanäle (17) eingesetzt sind, welche jeweils gleichmäßig radial beabstandet in dem Verteilungskörper (3) und dem Kolbenblock (14) bereitgestellt sind, wobei die ringförmigen Abstandshalter (9; 18) mit Hilfe einer ringförmigen Verteilungsplatte (10; 19) bedeckt sind und gehalten werden, die jeweils in einer druckdichten Weise mit dem Verteilungskörper (3) und dem Kolbenblock (14) verbunden ist und, wenn sie installiert ist, in der axialen Richtung jeweils über die Oberfläche des Verteilungskörpers (3) und des Kolbenblockes (14) vorsteht, und dass der Verteilungskörper auf seinem entgegengesetzten Ende mit einer Vielzahl radial beabstandeter blinder Löcher ausgebildet ist, in denen Druckfedern (12) angeordnet sind, die mittels einer an dem Gehäuse (1a) angebrachten Druckplatte (13) in die axiale Richtung gespannt sind.

2. Verteilungssystem für einen hydraulischen Kolbenmotor nach Anspruch 1, **dadurch gekennzeichnet, dass** eine der Verteilungsplatten (10, 19), vorzugsweise die mit dem Verteilungskörper (3) verbundene Verteilungsplatte (10), aus einem Material gefertigt ist, das widerstandsfähiger gegen Abnutzung und Abriss ist als die Verteilungsplatte (19), die mit dem Kolbenblock (14) verbunden ist.

3. Verteilungssystem für einen hydraulischen Kolbenmotor nach Anspruch 1 und 2, **dadurch gekennzeichnet, dass** jeder ringförmige Abstandhalter (9), der mit dem Verteilungskörper (3) verbunden ist, ein Durchgangsloch (9') umfasst, dessen Umriss auf der Zuführungsseite an den Umriss jedes Verteilungskanals (7, 7') in dem Verteilungskörper (3) angepasst ist und dass jeder ringförmige Abstandshalter (18), der mit dem Kolbenblock (14) verbunden ist, ein Durchgangsloch (18') umfasst, dessen Umriss auf der Ausstoßseite an den Umriss des Zuführungskanals (17) in dem Kolbenblock (14) angepasst ist.

4. Verteilungssystem für einen hydraulischen Kolbenmotor nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** der Umriss des Durchgangslochs (9') in dem ringförmigen Abstandshalter (9) auf der Ausstoßseite und der Umriss des Durchgangslochs (18) in dem ringförmigen Abstandshalter (18) auf der Zuführungsseite an den Umriss der Öffnungen in jeder der Verteilungsplatten (10, 19) angepasst ist.

5. Verteilungssystem für einen hydraulischen Kolbenmotor nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Verteilungsplatte (10) mit Verteilungsöffnungen (11) ausgebildet ist, deren radiale Position der radialen Position des Durchgangslochs (9') jedes ringförmigen Abstandshalters (9) gleicht, wobei der Umriss jedes Durchgangslochs (9') auf der Ausstoßseite jedes ringförmigen Abstandshalters (9) identisch zu dem Umriss der Verteilungsöffnung (11) ist, so dass die Durchgangslöcher (9') des ringförmigen Abstandshalters (9) und der Verteilungsöffnung (11) der Platte (10) vollständig zusammenfallen.

6. Verteilungssystem für einen hydraulischen Kolbenmotor nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Verteilungsplatte (19) mit Verteilungsöffnungen (20) ausgebildet ist, deren radiale Position gleich der radialen Position des Durchgangslochs (18') in dem ringförmigen Abstandshalter (18) ist, wobei der Umriss jedes Durchgangslochs (18') auf der Zuführungsseite jedes ring-

förmigen Abstandshalters (18) identisch zu dem Umriss der Verteilungsöffnung (20) ist, so dass die Durchgangslöcher (18') des ringförmigen Abstandshalters (18) und der Verteilungsöffnung (20) der Platte (19) vollständig zusammenfallen.

7. Verteilungssystem für einen hydraulischen Kolbenmotor nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Verteilungsplatten (10; 19) mittels Leimen bzw. Kleben, Löten oder ähnlichem in einer druckdichten Weise jeweils mit dem Verteilungskörper (3) und dem Kolbenblock (14) verbunden sind.

8. Verteilungssystem für einen hydraulischen Kolbenmotor nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** die ringförmigen Abstandshalter (9; 18) in einer druckdichten Weise jeweils mittels Leimen, Löten und ähnlichem mit dem Verteilungskörper (3) und dem Kolbenblock (14) ebenso wie mit der Verteilungsplatte (10; 19) verbunden sind.

Revendications

1. - Système de distribution pour un moteur hydraulique à piston, en particulier pour un moteur avec un bloc de pistons rotatif, ledit moteur comprenant un corps de distribution avec des canaux de distribution, et un bloc avec des pistons et des canaux d'alimentation disposés coaxialement par rapport au corps de distribution, des plaques de distribution sont associées d'une façon étanche à la pression avec les extrémités opposées d'un corps de distribution et d'un bloc de pistons, respectivement, lesdites plaques de distribution, lorsqu'elles sont installées, se projettent dans une direction axiale au-dessus de la surface du corps de distribution et du bloc de pistons, respectivement, les deux plaques de distribution comportant des ouvertures de distribution, la position radiale desdites ouvertures de distribution étant la même que la position radiale des canaux de distribution dans le corps de distribution et que la position radiale des canaux d'alimentation dans le bloc de pistons, respectivement, et les ouvertures de distribution coïncidant avec les canaux de distribution et les canaux d'alimentation, respectivement, le contour de chaque ouverture de distribution, dans au moins l'une des plaques de distribution (10; 19), étant choisi pour être un cercle, un carré, un rectangle ou un trapèze, de préférence, un segment annulaire, ***caractérisé par le fait que***, sur les extrémités opposées du corps de distribution (3) et du bloc de pistons (14), respectivement, des éléments d'espacement annulaires (9; 18) sont introduits d'une façon étanche à la pression dans chaque embouchure des canaux de distribution (7, 7') et des canaux d'alimentation (17), respectivement, lesquels sont disposés, également espacés radialement, dans le corps de distribution (3) et le bloc de pistons (14), respectivement, lesdits éléments d'espacement annulaires (9; 18) étant recouverts et maintenus au moyen d'une plaque de distribution annulaire (10; 19) qui est associée d'une façon étanche à la pression au corps de distribution (3) et au bloc de pistons (14), respectivement, et se projette dans une direction axiale, lorsqu'elle est installée, au-dessus de la surface du corps de distribution (3) et du bloc de pistons (14), respectivement, et **par le fait que** le corps de distribution (3) comporte sur son extrémité opposée une pluralité de trous borgnes espacés radialement, dans lesquels des ressorts de compression (12) sont disposés, lesquels sont chargés dans la direction axiale au moyen d'une plaque de pression (13) fixée au boîtier (1a).

2. - Système de distribution pour un moteur hydraulique à piston selon la revendication 1, ***caractérisé par le fait que*** l'une des plaques de distribution (10; 19), de préférence, la plaque de distribution (10) qui est associée au corps de distribution (3), est faite d'un matériau qui est plus résistant à l'usure et au déchirement que la plaque de distribution (19) qui est associée au bloc de pistons (14).

3. - Système de distribution pour un moteur hydraulique à piston selon les revendications 1 et 2, ***caractérisé par le fait que*** chaque élément d'espacement annulaire (9) associé au corps de distribution (3) comprend un trou traversant (9'), dont le contour au niveau du côté alimentation est adapté au contour de chaque canal de distribution (7, 7') dans le corps de distribution (3), et **par le fait que** chaque élément d'espacement annulaire (18) associé au bloc de pistons (14) comprend un trou traversant (18'), dont le contour au niveau du côté de décharge est adapté au contour du canal d'alimentation (17) dans le bloc de pistons (14).

4. - Système de distribution pour un moteur hydraulique à piston selon l'une quelconque des revendications 1 à 3, ***caractérisé par le fait que*** le contour du trou traversant (9') dans l'élément d'espacement annulaire (9) au niveau du côté de décharge et que le contour du trou traversant (18) dans l'élément d'espacement annulaire (18) au niveau du côté alimentation sont adaptés au contour des ouvertures dans chacune des plaques de distribution (10, 19).

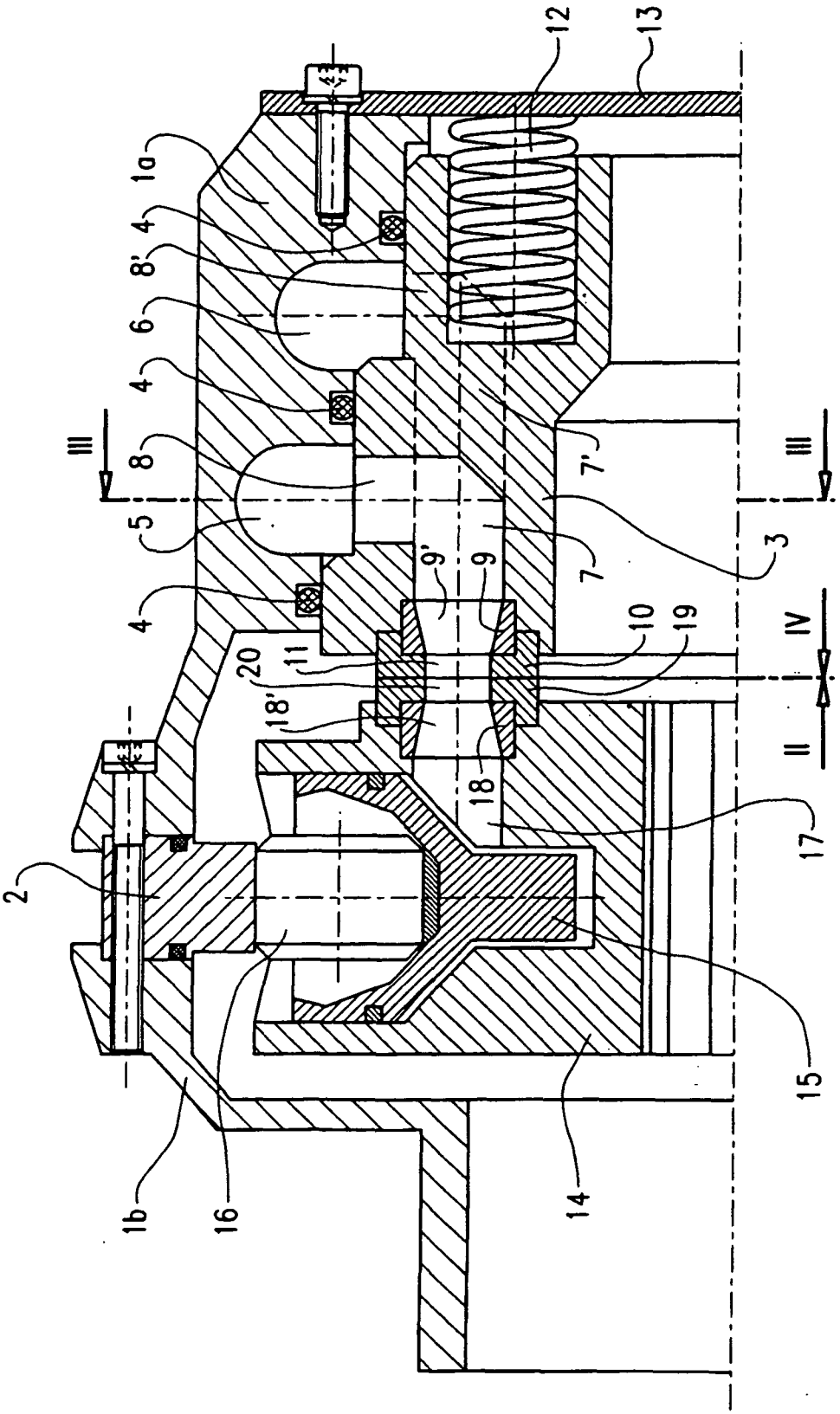
5. - Système de distribution pour un moteur hydraulique à piston selon l'une quelconque des revendications 1 à 4, ***caractérisé par le fait que*** la plaque de distribution (10) comporte des ouvertures de distribution (11) dont la position radiale est la même que la position radiale du trou traversant (9') de chaque élé-

ment d'espacement annulaire (9), le contour de chaque trou traversant (9') au niveau du côté de décharge de chaque élément d'espacement annulaire (9) étant identique au contour de l'ouverture de distribution (11), de telle sorte que les trous traversants (9') de l'élément d'espacement annulaire (9) et de l'ouverture de distribution (11) de la plaque (10) coïncident totalement.

6. - Système de distribution pour un moteur hydraulique à piston selon l'une quelconque des revendications 1 à 5, ***caractérisé par le fait que*** la plaque de distribution (19) comporte des ouvertures de distribution (20) dont la position radiale est la même que la position radiale du trou traversant (18') de chaque élément d'espacement annulaire (18), le contour de chaque trou traversant (18') au niveau du côté alimentation de chaque élément d'espacement annulaire (18) étant identique au contour de l'ouverture de distribution (20), de telle sorte que les trous traversants (18') de l'élément d'espacement annulaire (18) et de l'ouverture de distribution (20) de la plaque (19) coïncident entièrement.

7. - Système de distribution pour un moteur hydraulique à piston selon l'une quelconque des revendications 1 à 6, ***caractérisé par le fait que*** les plaques de distribution (10; 19) sont reliées d'une façon étanche à la pression au corps de distribution (3) et au bloc de pistons (14), respectivement, par collage, brasage et similaires.

8. - Système de distribution pour un moteur hydraulique à piston selon l'une quelconque des revendications 1 à 7, ***caractérisé par le fait que*** les éléments d'espacement annulaires (9; 18) sont reliés d'une manière étanche à la pression au corps de distribution (3) et au bloc de pistons (14), respectivement, ainsi qu'à la plaque de distribution (10; 19), par collage, brasage et similaires.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14

Fig. 1

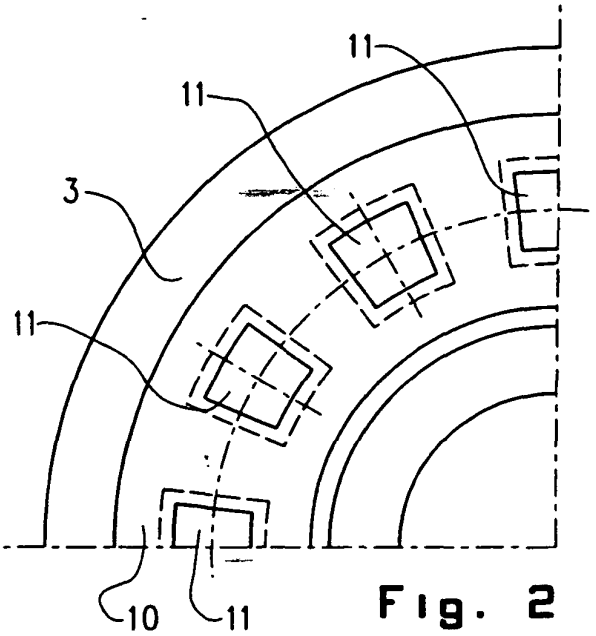

Fig. 2

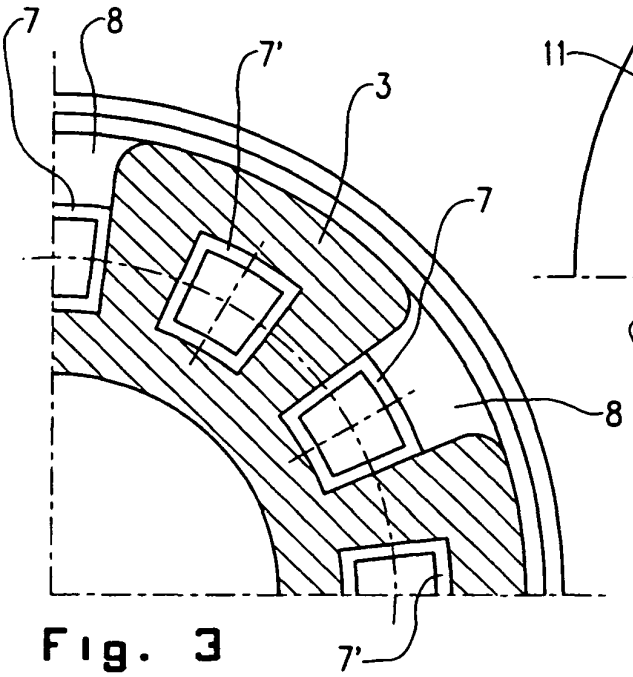

Fig. 3

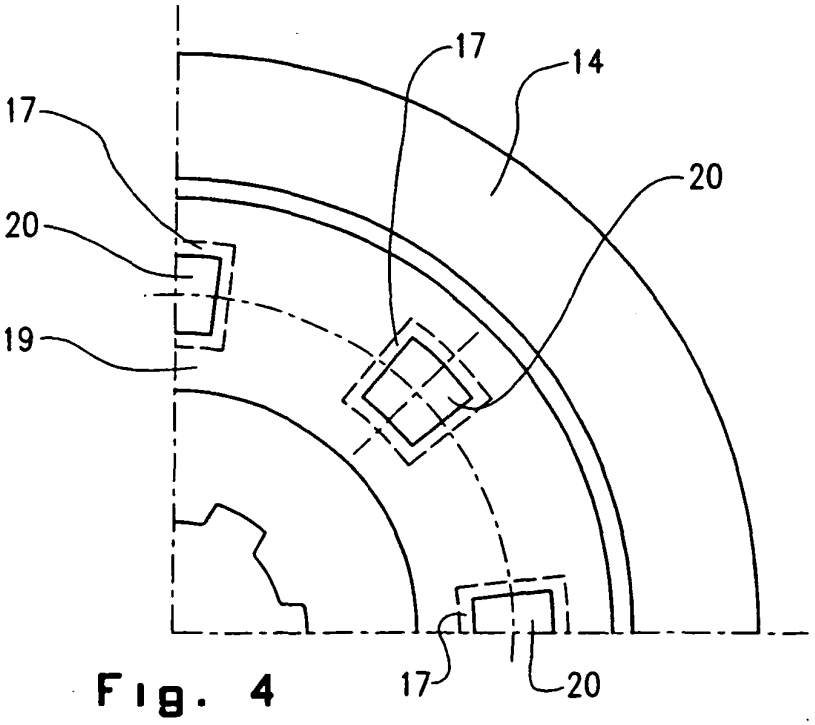

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 19653591 C1 **[0002]**
- US 4522110 A **[0003]**
- DE 4405123 **[0004]**