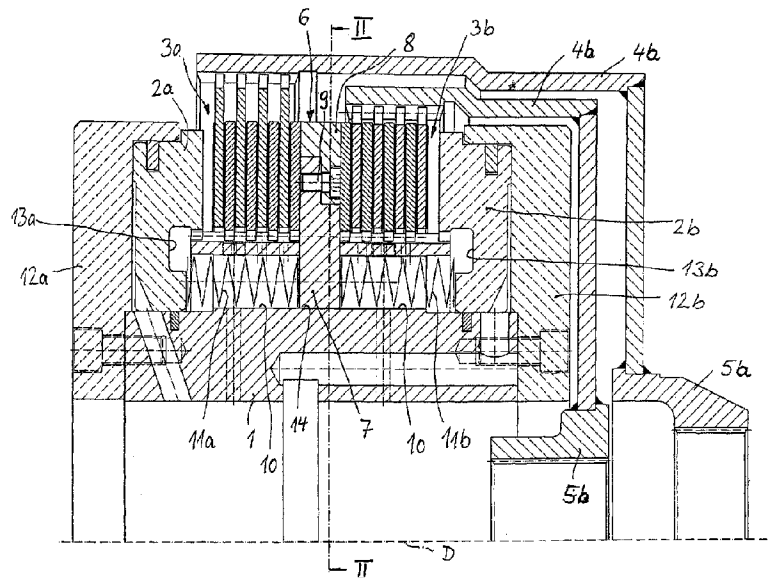




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(57) **Abrégé/Abstract:**

The invention relates to a dual shift coupling comprising two operatively connected coupling units, which are mounted on a shared, integrally formed inner body in a rotationally fixed and axially movable manner. The invention further comprises a multi-part pressure disk, which is arranged between the coupling units in an axially fixed manner and is supported by the inner body, and having two axially movable pressure pistons, which can be ventilated by respective pressure spring assemblies arranged in the inner body. According to the invention, a radial notch for accommodating the pressure disk is provided in the inner body, wherein the radial depth of said notch extends at least to radial inner wall segments of recesses for the pressure spring assemblies. Each pressure spring assembly comprises a plurality of pressure springs, which rest on the inner side of the pressure disk relative to the axis. The invention can be used in the manufacture of machine tools.

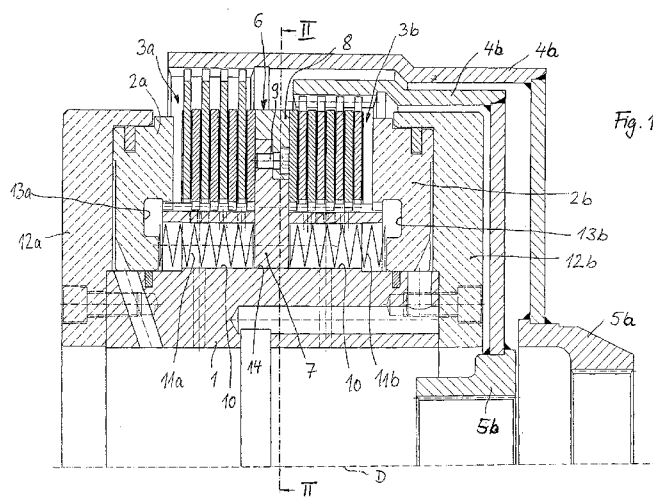
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(54) Title: DUAL SHIFT COUPLING

(54) Bezeichnung : DOPPELSCHALTKUPPLUNG



(57) **Abstract:** The invention relates to a dual shift coupling comprising two operatively connected coupling units, which are mounted on a shared, integrally formed inner body in a rotationally fixed and axially movable manner. The invention further comprises a multi-part pressure disk, which is arranged between the coupling units in an axially fixed manner and is supported by the inner body, and having two axially movable pressure pistons, which can be ventilated by respective pressure spring assemblies arranged in the inner body. According to the invention, a radial notch for accommodating the pressure disk is provided in the inner body, wherein the radial depth of said notch extends at least to radial inner wall segments of recesses for the pressure spring assemblies. Each pressure spring assembly comprises a plurality of pressure springs, which rest on the inner side of the pressure disk relative to the axis. The invention can be used in the manufacture of machine tools.

(57) Zusammenfassung:

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Eine Doppelschaltkupplung mit zwei kraftschlüssig wirksamen Kupplungseinheiten, die auf einem gemeinsamen, einstückigen Innenkörper drehfest und axial beweglich gelagert sind, sowie mit einer axial fest zwischen den Kupplungseinheiten angeordneten, auf dem Innenkörper gehaltenen Druckscheibe, die mehrteilig gestaltet ist, und mit zwei axial beweglichen Druckkolben, die mittels jeweils einer im Innenkörper angeordneten Druckfederanordnung lüftbar sind, ist bekannt. Erfindungsgemäß ist für die Aufnahme der Druckscheibe eine Radialnut im Innenkörper vorgesehen, deren radiale Tiefe sich wenigstens bis zu radial innenliegenden Wandungsabschnitten von Aussparungen für die Druckfederanordnungen erstreckt, und dass jede Druckfederanordnung mehrere Druckfedern umfasst, die sich axial innenseitig an der Druckscheibe abstützen. Einsatz im Werkzeugmaschinenbau.

DUAL SHIFT COUPLING

The invention relates to a dual clutch having two positively acting clutch units which are mounted in a rotationally fixed and axially movable manner, in relation to a clutch rotational axis, on a common, single-piece inner body, and having a pressure disk which is arranged in an axially fixed manner between the clutch units, is held on the inner body and is of multiple-piece design, and having two axially movable pressure pistons which can be ventilated by means of in each case one compression spring arrangement which is arranged in the inner body.

A dual clutch of this type is generally known (KMS catalog from the company Stromag AG). A dual clutch of this type has two positively acting clutch units in the form of multiple disk assemblies which are held on a common and single-piece inner body. A pressure disk is held on the inner body between the multiple disk assemblies. Each multiple disk assembly can be loaded on the side which lies opposite the pressure disk by a hydraulically actuated pressure piston which can be ventilated by compression springs. The compression springs are arranged in blind holes of the inner body, which blind holes are made in the inner body from opposite axial end sides.

It is an object of the invention to provide a dual

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clutch of the type which is mentioned at the outset, which dual clutch makes simplified production possible.

This object is achieved by virtue of the fact that a radial groove is provided in the inner body in order to receive the pressure disk, the radial depth of which radial groove extends at least as far as radially inner wall sections of cutouts for the compression spring arrangements, and that each compression spring arrangement comprises a plurality of compression springs which are supported axially on the inside on the pressure disk. Simplified production of the cutouts for the compression spring arrangements is made possible by virtue of the fact that the pressure disk is inserted so deeply into the inner body that its opposite axial end faces which are positioned radially inside the outer contour of the inner body can serve to support the compression springs. As a result, the production of the inner body is simplified. This permits inexpensive production of the dual clutch. The dual clutch according to the invention is provided for use in an industrial transmission system, in particular for a drive of an exploration pump for mineral oil extraction. As an alternative, the invention can also be provided in machine tool construction or in commercial vehicle construction or the like. The cutouts can be extended axially beyond the receptacle for the pressure disk by virtue of the fact that the receptacle for the pressure disk and the cutouts for the compression spring arrangements intersect one

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another in the inner body. The support of the compression springs directly on the pressure disk ensures a flat, radially oriented supporting face which makes an improved action of the compression springs possible.

In one refinement of the invention, the cutouts of axially opposite compression springs of the two compression spring arrangements are aligned axially with one another.

In a further refinement of the invention, all the cutouts which are aligned axially with one another in the inner body are formed in each case by through holes which penetrate the inner body completely axially. Said through holes can be drilled axially through the inner body in one work operation. Blind holes are avoided. The through holes can be equipped from both axial end sides of the inner body. This means that two compression springs which are aligned with one another of the one and the other clutch unit can be introduced into a single through hole from opposite end sides of the inner body, which compression springs are supported on opposite axial end faces on the common, centrally arranged pressure disk.

In a further refinement of the invention, the pressure disk has at least two pressure disk sections which adjoin one another in the circumferential direction and are connected to one another radially on the outside by a single-piece, circumferential carrier ring. As a result of this refinement, the pressure disk sections are not connected to

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one another directly, but rather indirectly via the single-piece carrier ring which is circumferential radially on the outside. The multiple-piece design of the pressure disk is necessary, in order to make assembly and dismantling within the radial groove of the inner body possible. The fastening of the pressure disk sections to the single-piece carrier ring ensures a particularly exact radial orientation of the pressure disk sections and particularly high stability and accuracy of fit.

In a further refinement of the invention, the carrier ring comprises a radially inwardly projecting fastening flange, on which the pressure disk sections are held by means of axially acting fastening means. This refinement ensures a particularly stable and low-tolerance, rigidly connected pressure disk form.

Screw connections are provided as fastening means in a particularly advantageous way. In addition to other mechanical fastening means which can be provided according to the invention, the screw connections have the advantage that they represent releasable connections. Corresponding threaded holes are advantageously provided in the carrier ring or in the pressure disk sections, with the result that the screw connection do not require any nuts or similar counterpieces as separate components, but rather that the use of screws is sufficient to secure the screw connections.

Further advantages and features of the invention

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result from the claims and from the following description of one preferred exemplary embodiment of the invention which is shown using the drawings, in which:

fig. 1 shows a longitudinal sectional illustration of an upper half of one embodiment of a dual clutch according to the invention, and

fig. 2 shows an illustration on a reduced scale of a cross section through the dual clutch according to fig. 1 along the sectional line II-II in fig. 1.

A dual clutch according to figs. 1 and 2 has a single-piece inner body 1 which is fixed on a shaft (not shown). The inner body 1 including the shaft (not shown) rotates about a clutch rotational axis D during operation of the dual clutch. Two clutch units 3a and 3b which are designed in each case as frictionally or positively acting multiple disk clutches are arranged on the common inner body 1. In order to hold inner disks of the two multiple disk assemblies of both multiple disk clutches in a rotationally fixed but axially movable manner, the inner body 1 is provided on the outside with axial toothing systems which are oriented in an axially parallel manner with respect to the clutch rotational axis D. Each multiple disk assembly has outer disks which are arranged in an axially alternating

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manner with respect to the inner disks and are provided radially on the outside with external toothing systems for driving in a rotationally fixed but axially movable manner on an inside axial toothing system of in each case one clutch housing 4a, 4b. Both clutch housings 4a and 4b form the clutch outer bodies of the respective clutch unit 3a and 3b, the clutch housing 4a being assigned to the clutch unit 3a and the clutch housing 4b being assigned to the clutch unit 3b. Both clutch housings 4a and 4b have the same axial orientation, the clutch housing 4a overlying the clutch housing 4b on the outside. Accordingly, the multiple disk assembly of the clutch unit 3a is also provided with a greater radial diameter than the multiple disk assembly of the clutch unit 3b. Both clutch housings 4a and 4b are provided on clutch hubs 5a and 5b which adjoin one another axially and are positioned on the axial side next to the inner body 1. The two clutch hubs 5a and 5b have different diameters and are provided for fastening on shafts (not shown) with different diameters. The clutch hub 5a is preferably fastened on a hollow shaft and the clutch hub 5b is held on a shaft which penetrates the hollow shaft coaxially.

In order to load the multiple disk assemblies of the clutch units 3a and 3b with pressure, the clutch unit 3a is assigned a pressure piston 2a and the clutch unit 3b is assigned a pressure piston 2b. The two pressure pistons 2a

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and 2b are arranged on opposite axial end regions of the inner body 1 such that they can be displaced on said inner body 1. In addition, each pressure piston 2a, 2b is assigned a housing section 12a, 12b which is screwed to the inner body 1 on the respective axial end side and guides and seals the pressure piston 2a radially on the outside. The pressure pistons 2a, 2b are held by compression spring arrangements 11a and 11b in their ventilated positions according to fig. 1. One compression spring arrangement 11a is assigned to the clutch unit 3a and the other compression spring arrangement 11b is assigned to the clutch unit 3b. Both compression spring arrangements 11a, 11b have a plurality of compression coil springs which are arranged distributed over the circumference of the pressure piston 2a, 2b. The compression coil springs are arranged in cutouts 10 of the inner body 1, which cutouts 10 extend in an axially parallel manner with respect to the clutch rotational axis D from an axial end side of the inner body 1 axially through the entire inner body 1 as far as its axially opposite end side. A plurality of cutouts 10 which are of identical configuration are provided distributed over the circumference of the inner body 1.

The compression coil springs of the compression spring arrangements 11a and 11b are supported axially on the inside on a common pressure disk 6 which is fitted into a radial groove 14 (fig. 2) of the inner body 1. As can be seen

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using fig. 1, the radial groove 14 intersects the cutouts 10 which are configured as through holes, in such a way that a bottom of the radial groove 14 is aligned with a radially inside wall of each through hole 10. Accordingly, the compression coil springs are supported over the full area on the right-hand or left-hand end face of the pressure disk 6 in the drawing according to fig. 1.

In order for it to be possible to mount the pressure disk 6 in the radial groove of the inner body 1, the pressure disk 6 has two pressure disk sections 7, 7' which are designed in each case as ring halves. The two ring halves are joined to one another in an abutting manner (designation S in fig. 2), so that they result in a common pressure disk ring. The two pressure disk sections 7, 7' are connected to one another by a circularly circumferential, single-piece carrier ring 8. To this end, the carrier ring 8 has a radially inwardly projecting fastening flange which is not denoted in greater detail. The pressure disk sections 7, 7' have corresponding, radially outwardly projecting shoulder regions which are provided with threaded holes (fig. 1). Headed bolts 9 which are countersunk in the fastening flange of the carrier ring 8 can be screwed into said threaded holes. The headed bolts 9 are oriented axially parallel with respect to the clutch rotational axis D and therefore axially. Accordingly, the threaded holes are also provided with axial thread axes.

Patent Claims

1. A dual clutch having two positively acting clutch units (3a, 3b) which are mounted in a rotationally fixed and axially movable manner, in relation to a clutch rotational axis, on a common, single-piece inner body (1), and having a pressure disk (6) which is arranged in an axially fixed manner between the clutch units, is held on the inner body (1) and is of multiple-piece design, and having two axially movable pressure pistons (2a, 2b) which can be ventilated by means of in each case one compression spring arrangement (11a, 11b) which is arranged in the inner body (1), characterized in that a radial groove (14) is provided in the inner body (1) in order to receive the pressure disk (6), the radial depth of which radial groove (14) extends at least as far as radially inner wall sections of cutouts (10) for the compression spring arrangements (11a, 11b), and in that each compression spring arrangement (11a, 11b) comprises a plurality of compression springs which are supported axially between the pressure disk (6) and the pressure pistons (2a, 2b).

2. The dual clutch as claimed in claim 1, characterized in that the cutout (10) of axially opposite compression springs of the two compression spring arrangements (11a, 11b) are aligned axially with one another.

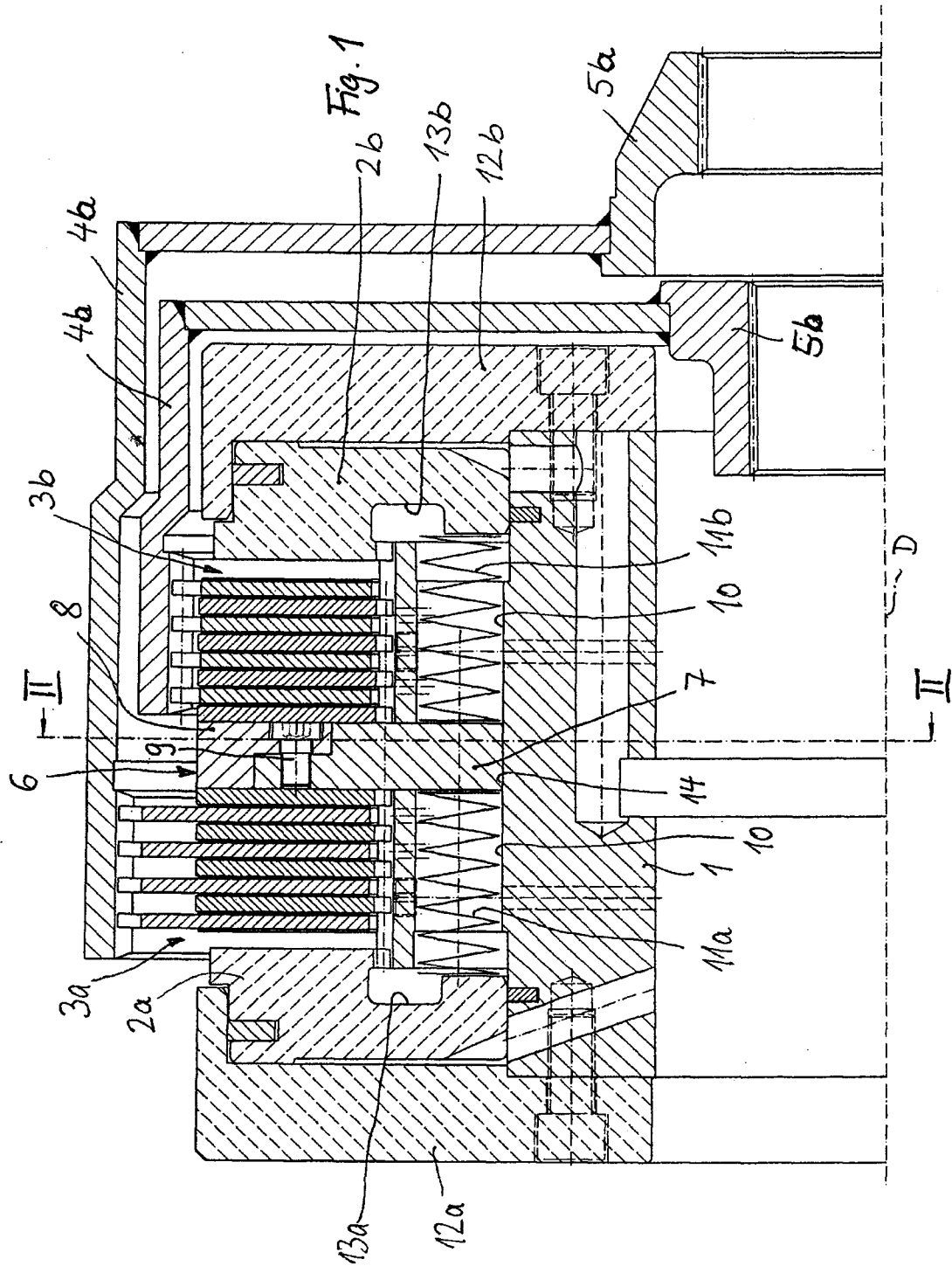
3. The dual clutch as claimed in claim 2, characterized

in that all the cutouts (10) which are aligned axially with one another in the inner body (1) are formed in each case by through holes which penetrate the inner body completely axially.

4. The dual clutch as claimed in claim 1, characterized in that the pressure disk (6) has at least two pressure disk sections (7, 7') which adjoin one another in the circumferential direction and are connected to one another by a single-piece, circumferential carrier ring (8).

5. The dual clutch as claimed in claim 4, characterized in that the carrier ring (8) comprises a radially inwardly projecting fastening flange, on which the pressure disk sections (7, 7') are held by means of axially acting fastening means (9).

6. The dual clutch as claimed in claim 5, characterized in that screw connections are provided as the fastening means (9).



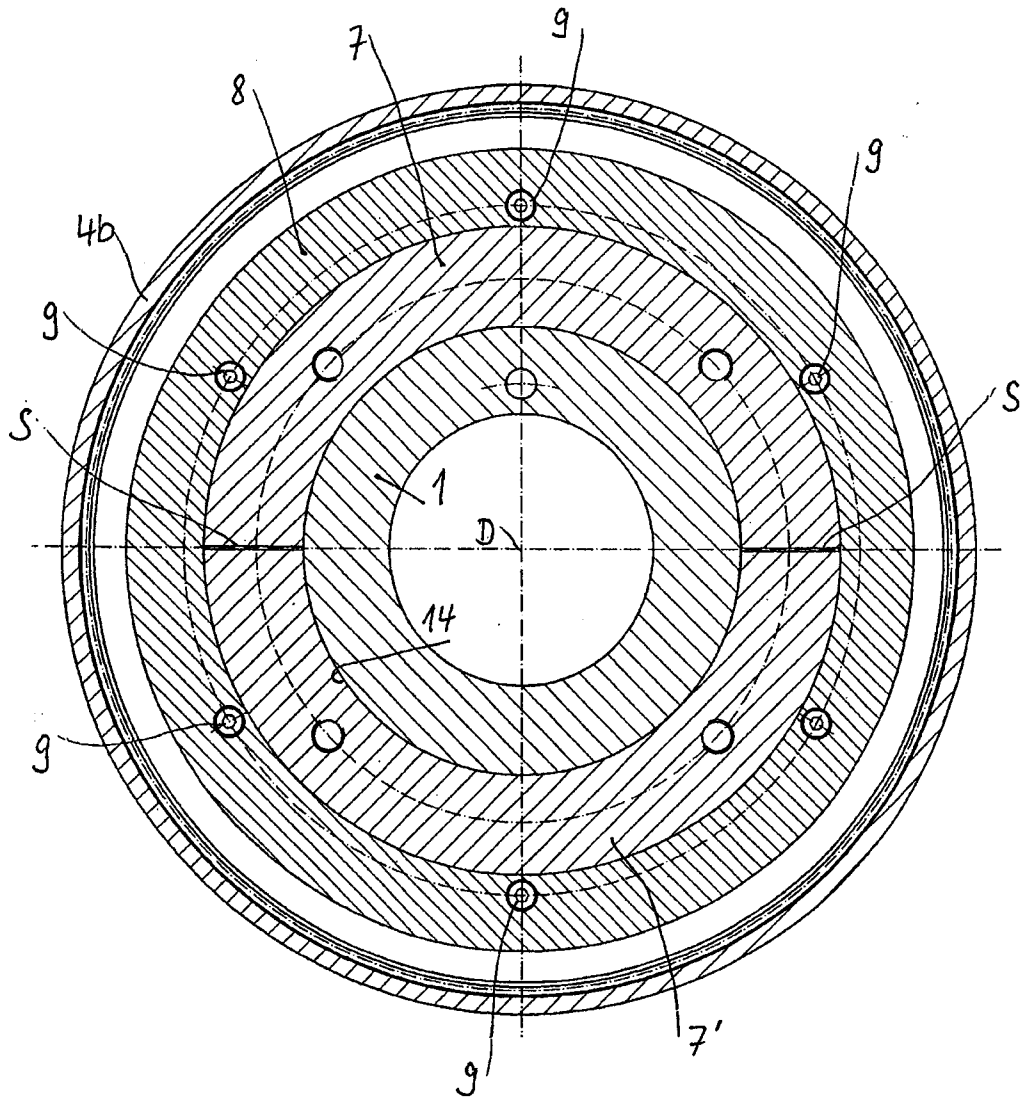


Fig. 2

