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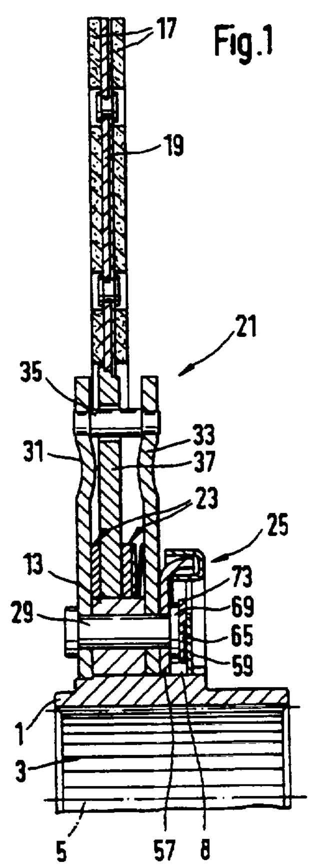
(54) Abstract Title
Clutch disc assembly for a motor vehicle clutch

(57) A clutch disc assembly is composed of an inner hub 1 with internal toothing (3, Fig 2) keyed on a transmission shaft and outer toothing (7) which engages with internal toothing of an outer hub 13 with some rotary clearance. Lateral discs 31, 33 fastened together with rivets have the outer hub 13 and an intermediate disc 37 with friction linings 17 therebetween. Helical springs (45) are located in openings (39, 41, 43) in the discs 31, 33, 37 to form therewith a load torsional oscillation damper 21. An idling torsional oscillation damper 25 composed of two annular discs 57, 59 with springs (67) in pockets therein is located alongside one of the lateral discs 33. The load and idling dampers have friction devices 23, (27) and the idling friction device (27) has a component 73 equipped with toothing (77) which engages with a reduced diameter axial region 8 of the external toothing (7) of the inner hub 1.

Fig.1



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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

Fig.1

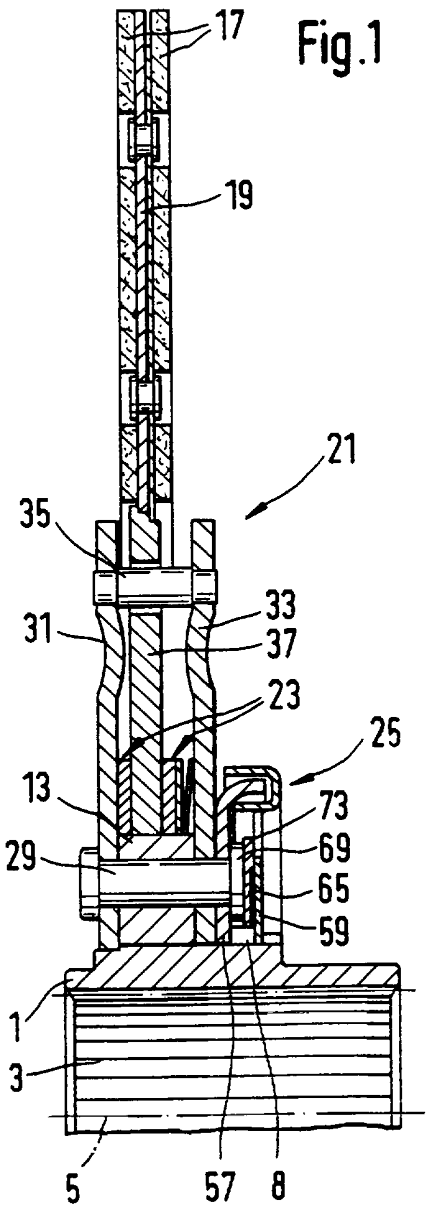


Fig.2

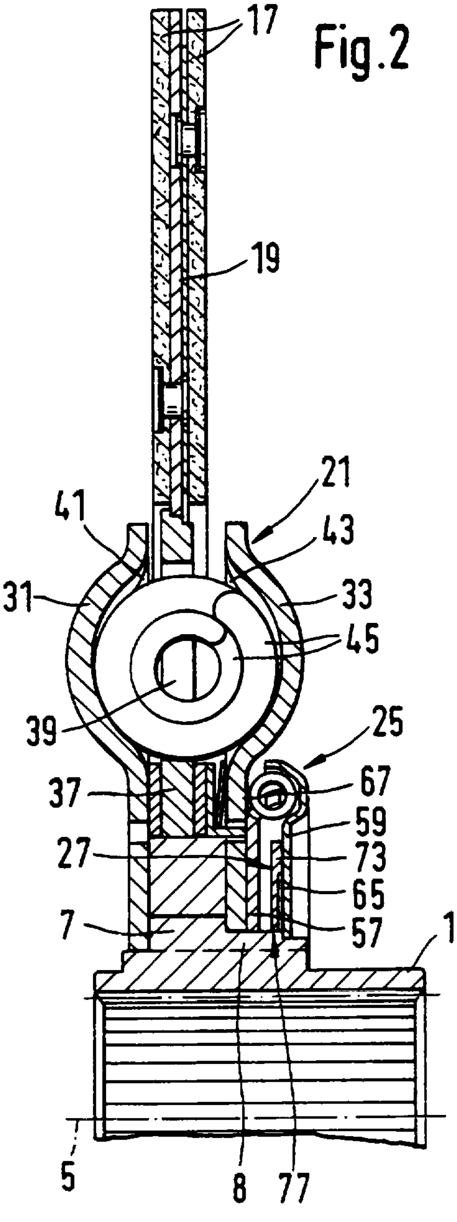
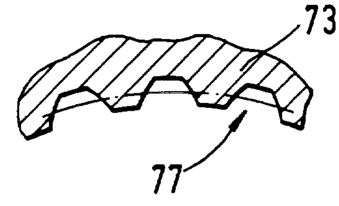


Fig.3



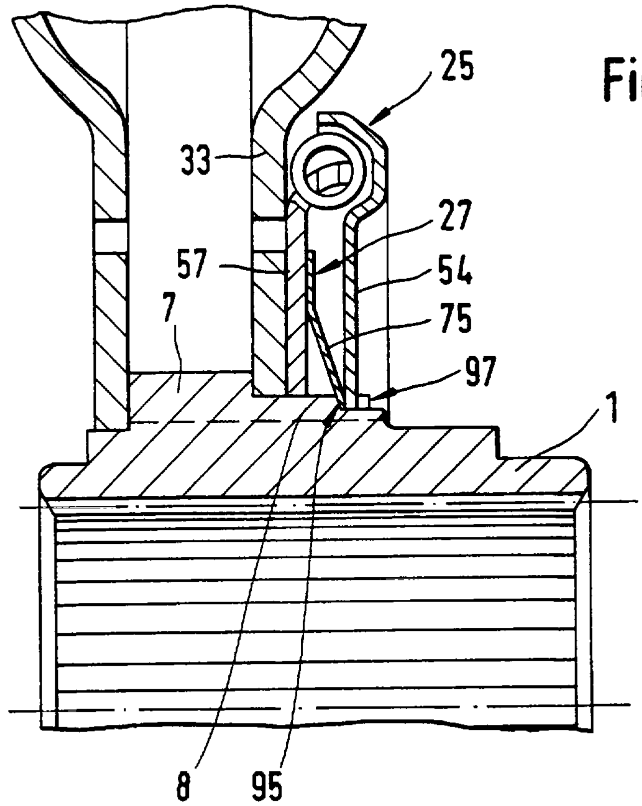


Fig. 4

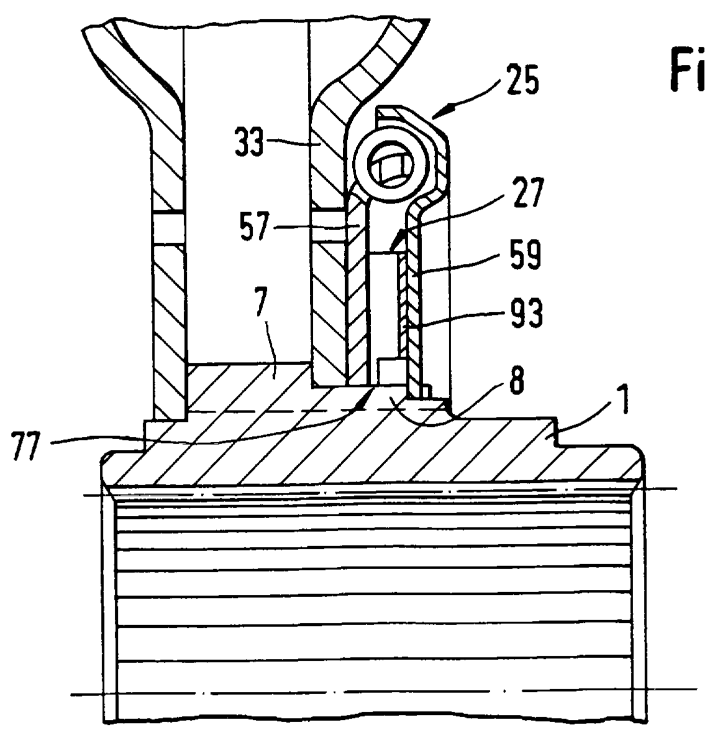


Fig. 5

Fig.6

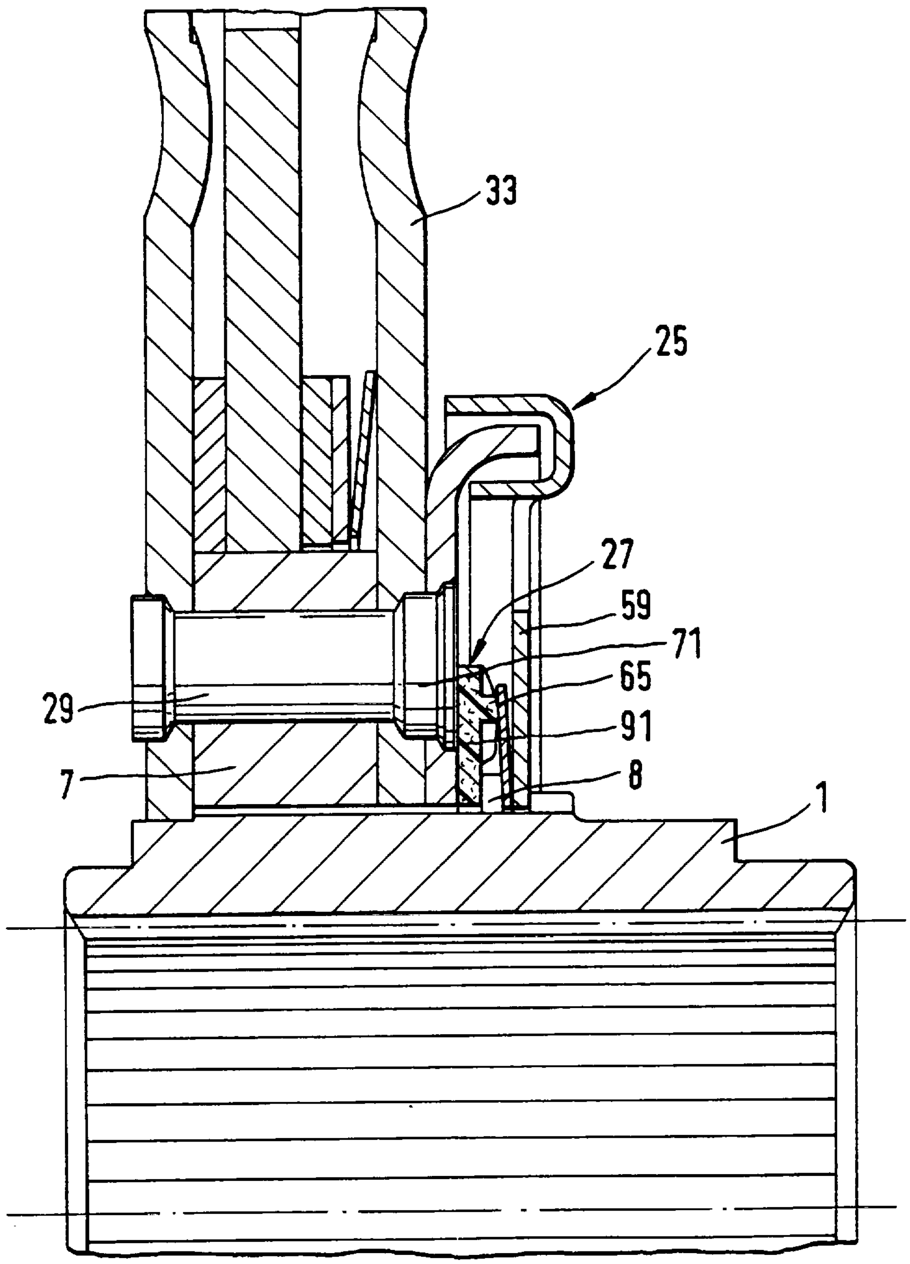


Fig.7

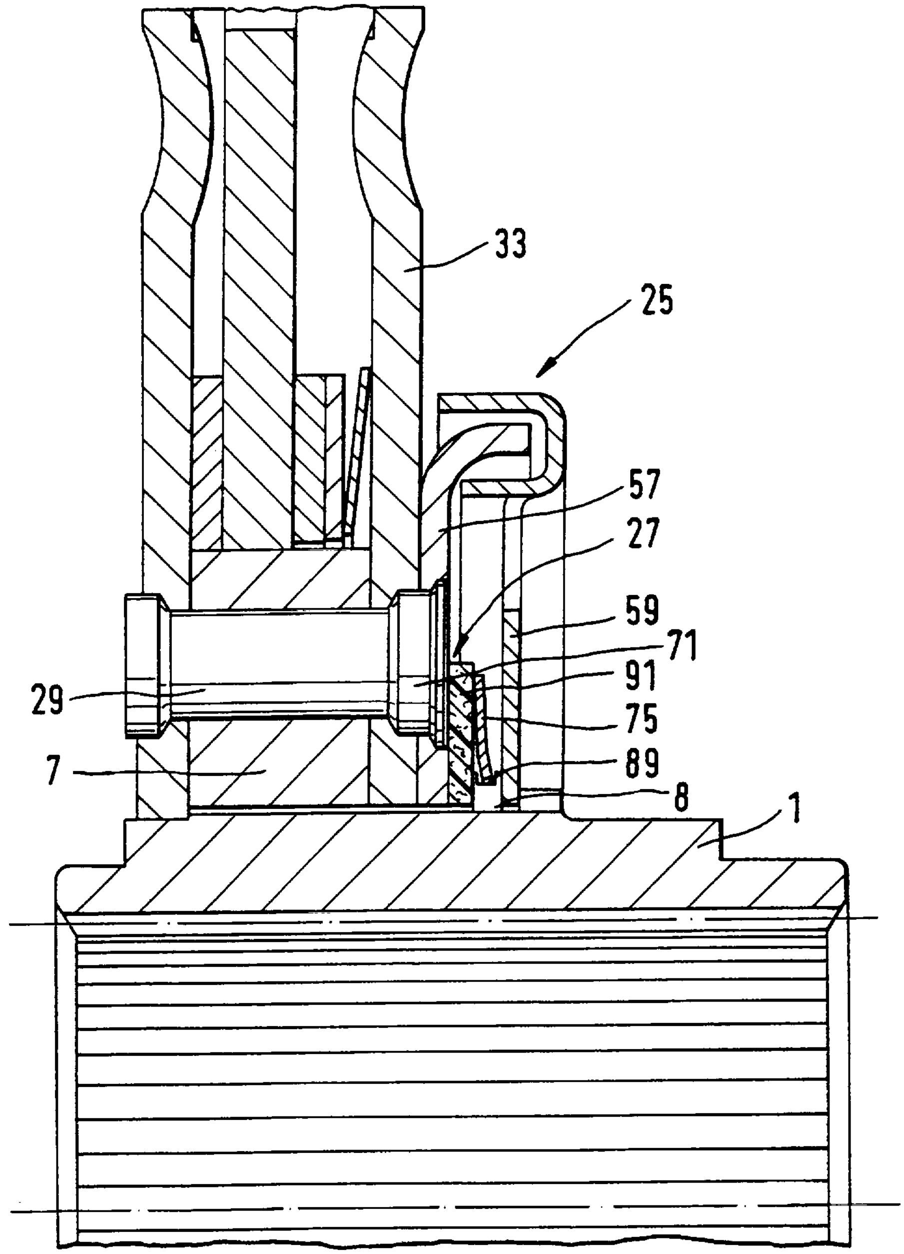


Fig. 8

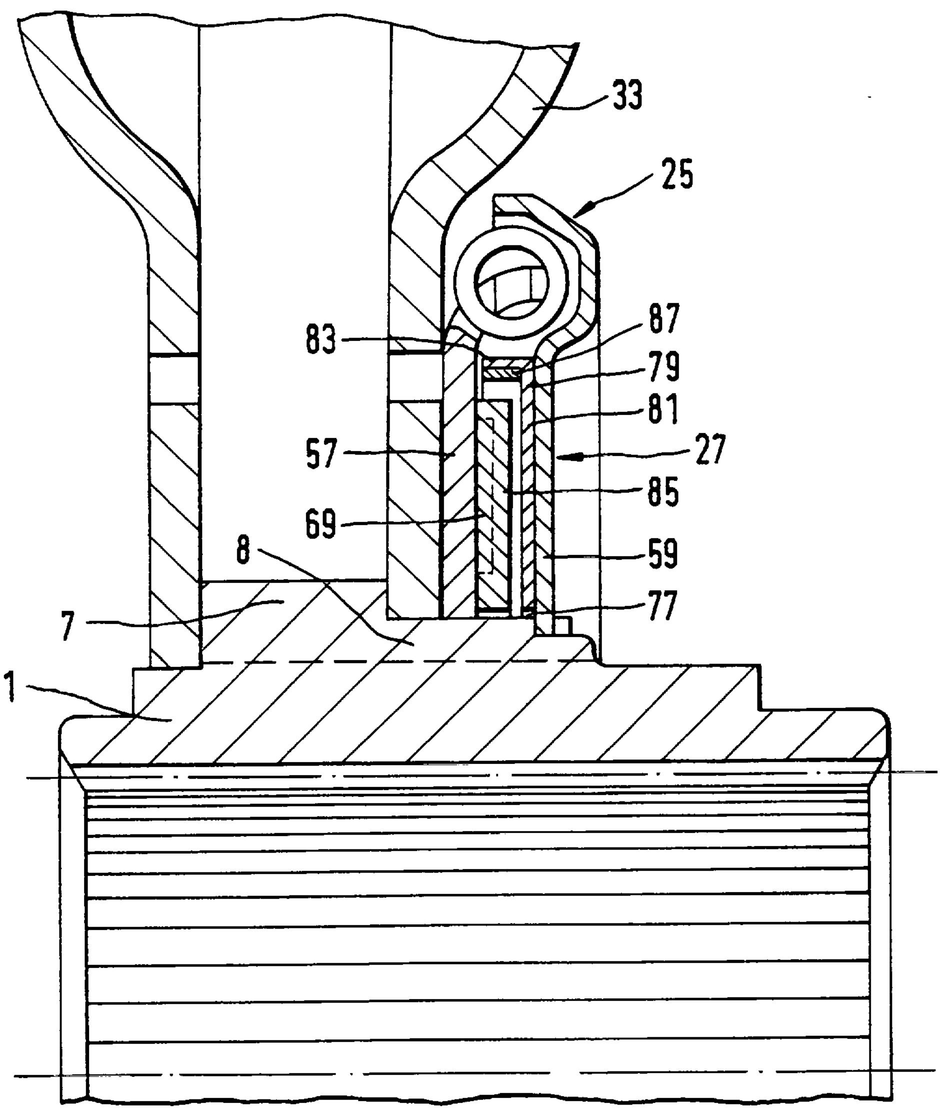
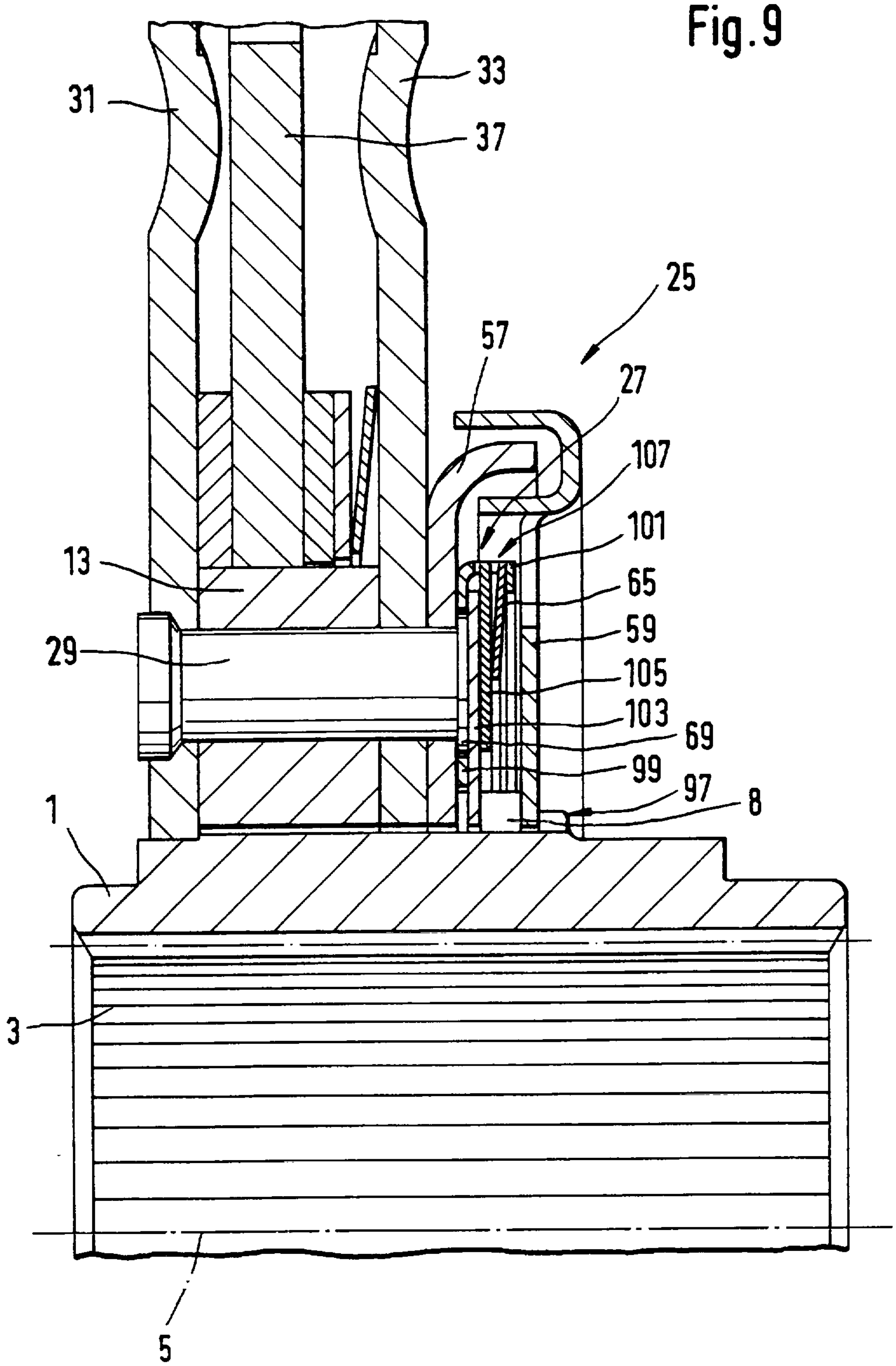


Fig. 9



Clutch Disc Assembly for a Motor Vehicle Clutch

The invention relates to a clutch disc assembly for a motor vehicle friction clutch which is equipped with a load and an idling torsional oscillation damper.

A clutch disc assembly is known from German Patent Specification 35 42 491. In this known construction, in the region of the axial extent of an outer hub, an inner hub is provided with external toothing, in which internal toothing of the outer hub engages. The torsional play of this toothed engagement determines the effective range of the idling torsional oscillation damper. At the same time, the parts of the load torsional oscillation damper are guided in the axial direction by the external toothing of the inner hub. In this known construction, a friction device for the idling torsional oscillation damper is arranged so that an annular disc securely connected to the inner hub is acted upon by force.

It is an object of the present invention to provide an improved clutch disc assembly in which the friction device for the idling torsional oscillation damper is located in a space-saving manner and in which loading of the annular disc of the idling damper is kept as low as possible.

According to the invention there is provided a clutch disc assembly for a motor vehicle friction clutch; said assembly comprising:

an inner hub with internal toothing and external toothing,

an outer hub surrounding the inner hub, the outer hub being equipped with internal toothing engaging in the external toothing of the inner hub, whereby to connect the outer hub in a non-rotary manner to the inner hub but with predetermined rotary clearance;

an entrainment disc able to rotate over a limited angle of rotation relative to the outer hub and provided with clutch friction linings,

a load torsional oscillation damper rated for operation under load, the load damper being equipped with two damper parts able to rotate relative to one other and supported in a resilient rotary manner one against the other by a plurality of springs, one load damper part being connected to the outer hub and the other load damper part being connected to the entrainment disc, one of the load damper parts comprising two lateral discs arranged at an axial distance apart and connected together and the other load damper part comprising an intermediate disc located between the lateral discs and supported on the lateral discs by way of the springs,

an idling torsional oscillation damper rated for idling operation located axially to the side of one of lateral discs on the side axially remote from the intermediate disc, the idling torsional oscillation damper having two damper parts able to rotate relative to each other and supported in a resilient rotary manner one against the other by way of one or more springs, one idling damper part being connected to the outer hub and the other idling damper part being connected to the inner hub, the two damper parts of the idling torsional oscillation damper being constructed as annular discs, which in the region of their outer periphery act on the spring(s) of the idling torsional oscillation damper, wherein the load torsional oscillation damper employs a load friction device rated for operation under load and the idling torsional oscillation damper employs an idling friction device rated for idling operation, parts of the idling friction device are located axially between the annular discs and radially inside the springs, the external toothing of the inner hub between the lateral disc of the load torsional oscillation damper facing the idling torsional oscillation damper and the axially outer annular disc of the idling torsional oscillation damper is extended with a reduced outer diameter and at least one part of the idling friction device engages with internal toothing in a non-rotary manner without clearance for rotary entrainment in the extended external toothing of the inner hub.

It is advantageous if the one part of the idling friction device provided with the toothing for keying to the inner hub is constructed as an axially acting spring. A construction of this type produces a particularly simple friction device, in which the axially acting spring is simultaneously constructed as a non-rotary component with the inner hub and produces a frictional force with respect to the annular disc able to rotate at the same time. The annular disc of the idling torsional oscillation damper as well as the axially acting spring, can be applied axially to a shoulder of the external toothing of the inner hub and fastened together. Such a construction is particularly advantageous with regard to assembly and manufacturing costs.

However, it is also possible to construct the one part of the idling friction device keyed to the inner hub as a friction ring, which itself is loaded by a spring in the direction of the lateral disc. In such an arrangement, the necessary frictional force can be adapted to a substantially greater extent and the spring can be interposed as a simple component, for example as an undulating spring or cup spring.

A further advantageous embodiment provides that the one part of the idling friction device keyed to the inner hub is a thrust washer, which is located axially between a spring and a friction ring. The spring then loads the thrust washer and the friction ring in the direction of the lateral disc. With such a construction, a very uniform surface loading of the friction ring is guaranteed, since the thrust washer rests flat on the friction ring, whereas the support of the spring with respect to the thrust washer is not critical.

The spring can also be in the form of a cup spring, which is located axially between the friction ring and annular disc and is supported axially on the outer periphery of the extension of the external toothing in a groove. Due to such a construction, the annular disc of the idling torsional oscillation damper is kept axially free from forces, since the spring is supported in a separate groove in the inner hub.

A further embodiment of a space-saving and axially force-free idling friction device is provided where the idling friction device consists of an approximately cup-shaped component, with a base adjacent to one of the annular discs, and an edge or rim region which extends axially in the direction of the other annular disc, a ring member, which is arranged to be non-rotatable with respect to the other annular disc and is located essentially in the space radially within the edge region and a radially clamped friction member located between the outer diameter of the ring member and the inner diameter of the edge region. Such a construction is able to produce relatively high frictional forces, since on the one hand the central friction radius is located directly radially within the idling springs and on the other hand, the cup-shaped component may be constructed to be very rigid. The friction member can be constructed either as an undulating spring, which is clamped radially from the outside and from the inside or as an open clamping ring, which bears with inherent tension either radially inwards or radially outwards and is controlled by way of its open gap and by way of the corresponding construction of the other component.

A further advantageous feature of the invention is to combine the parts of the idling friction device as a modular component which can be pre-assembled. Due to the production of the idling friction device as one constructional component, it is possible to check the function of the latter before it is installed in the clutch disc assembly and to ascertain whether the tolerances provided for the frictional force are maintained. If necessary, this modular component may be replaced by another component, whereof the frictional force lies in the prescribed range. It is thus possible to avoid the situation whereby after its complete assembly, the complete clutch disc assembly is either unusable or has to be dismantled completely and re-built.

It is particularly advantageous if the modular component is provided with at least two members initially tensioned axially one against the other by spring force and towards the outside is constructed to be free of forces. Such a component can be easily mounted, since due to its freedom from forces in the axial direction, it needs solely to be inserted in the installation space provided.

It can be provided that extending into the axial space between both annular discs are rivet heads, which are constructed for the rotary entrainment of at least one other part of the idling device. Then, for driving the idling friction device, already existing components can be used, on the one hand the extended external toothing of the hub and on the other hand the rivet heads, which have to be present anyhow on the rivets. In this case, the rivet heads may belong to rivets which connect one annular disc to the corresponding lateral disc of the load torsional oscillation damper or the rivet heads may belong to rivets which connect the two lateral discs of the load torsional oscillation damper to the outer hub.

The invention may be understood more readily, and various other features of the invention may become apparent, from consideration of the following description.

Embodiments of the invention will now be described in detail by way of examples hereafter and with reference to the accompanying drawings, wherein:

Figure 1 is a longitudinal section of part of a clutch disc assembly constructed in accordance with the invention;

Figure 2 is another longitudinal section of part of the clutch disc assembly shown in Figure 1;

Figure 3 depicts part of the toothed friction ring used in the assembly shown in Figures 1 and 2;

Figure 4 is a sectional view of part of another clutch disc assembly on a somewhat larger scale showing a simple friction device in the form of a cup spring;

Figure 5 is a sectional view corresponding to Figure 4 but showing a friction device in the form of an undulating spring;

Figure 6 is a sectional view of part of a further clutch disc assembly showing a friction ring and a spring;

Figure 7 is a sectional view of part of a further clutch disc assembly with a cup spring supported axially separately;

Figure 8 is a sectional view of part of a further clutch disc assembly showing a radially clamped spring and

Figure 9 is a sectional view of part of a further clutch disc assembly with an idling friction device constructed as a modular component.

Figures 1 to 3 show in two partial sections the total installation of an idling friction device 27 in a clutch disc assembly constructed in accordance with the invention. The clutch disc assembly employs an inner hub 1 rotatably locked by internal toothing 3 keyed on a transmission shaft (not shown). The transmission shaft is able to rotate about a common axis of rotation 5. The inner hub 1 has external toothing 7, in which an outer hub 13 with corresponding internal toothing engages in a non-rotary manner with clearance in the peripheral direction. This clearance in the peripheral direction determines the effective range of an idling torsional oscillation damper 25. Fixed on both sides of the outer hub 13 are side plates or discs 31, 33. These discs 31, 33 are fastened together by way of a plurality of rivets 29 distributed around the periphery. In their radially outer region, the two lateral discs 31 and 33 are securely connected to each other by way of spacing rivets 35 and they are kept at a distance apart. Located axially between the two discs 31 and 33 is an intermediate disc 37, which is guided radially on the outer hub 13 and which is connected radially outside the spacing rivets 35 to friction linings 17 as well as an entrainment disc 19. A lining spring mounting may be provided between the entrainment disc 19 and the friction linings 17. Provided approximately on the periphery between the individual spacer rivets 35, both in the lateral discs 31 and 33 as well as in the intermediate disc 37, are windows or openings 39, 41, 43, in which helical springs 45 are inserted. These lateral discs 31, 33 with the intermediate disc 34 and the openings 39, 41, 43 with the springs 45 form a load torsional oscillation damper 21. When acted upon by torque in a corresponding manner, the intermediate disc 37 may rotate relative to the lateral discs 31 and 33 against the force of the springs 45. A load friction device 23 is provided, which is located between the two lateral discs 31 and 33 as well as the intermediate disc 37 and consists for example of friction rings and at least one axially acting spring.

The idling torsional oscillation damper 25 is located laterally outside the disc 33. The damper 25 consists of two annular discs 57 and 59 as well as of a plurality of helical springs 67 distributed on the periphery, which are located in openings or pockets in the two annular discs 57 and 59. In this case, one annular disc 57 is applied against the outside of the disc 33 and non-rotatably connected to the latter. This non-rotary connection is established by the rivets 29, in which case the rivet head 69 of each rivet 29, as illustrated in Figure 1 projects axially in the direction of the annular disc 59. However it is also possible to countersink the rivet heads 69 and to provide another connection between the annular disc 57 and the lateral disc 33. Provided axially between the two annular discs 57 and 59 as well as radially within the helical springs 67 is a friction device 27 for idling operation. In Figures 1 to 3, this idling friction device 27 consists of a friction ring 73, which is non-rotatably connected to the inner hub 1, but is axially displaceable. The friction ring 73 is acted upon axially by a spring 65, which is located between the ring 73 and the annular disc 59. The friction ring 73 is in this case loaded in the direction of the outer hub 13 or in the direction of the lateral disc 33 and the ring 73 frictionally engages on the rivet heads 69 of the rivets 29 distributed around the periphery. The non-rotary connection between the friction ring 73 and the inner hub 1 takes place due to the fact that the external toothing 7 of the inner hub 1 is lengthened axially in the region 8 between the lateral disc 33 and the annular disc 59 with a reduced outer diameter and the friction ring 73 is provided with a corresponding internal toothing 77 (Figure 3), which engages without clearance, in the peripheral direction with the toothing 7 on the extension 8 of the hub 1. Due to this arrangement, in the range of effectiveness of the idling torsional oscillation damper 25, during the relative movement between the annular disc 57 and the annular disc 59, a frictional force is produced, which on the one hand is dependent on the axial biasing force of the spring 65 and on the other hand on the coefficient of friction between the friction ring 73 and the rivet heads 69. Due to the arrangement of the friction ring 73, the annular disc 59 can be kept free from peripherally acting frictional forces of the idling friction device 27. The spring 75 may be constructed as an undulating spring or a cup spring, and its radial centering may take place both in a flange of the friction ring 73 (on its outer diameter) as well as by way of its inner diameter and by way of the outer diameter of the extension 8 of the external toothing 7. In this case, the friction ring 73 may have a perfectly flat construction on both sides.

The method of operation of the clutch disc assembly is briefly as follows:

When acted upon by torque of low magnitude or at the time of idling, the load torsional oscillation damper 21 behaves as a rigid component and relative movement in the peripheral direction takes place between the lateral discs 31, 33 and the annular disc 57 on one side and the inner hub 1 or the annular disc 59 on the other side. At the time of this relative movement, the idling friction device 37 comes into operation.

When acted upon by a greater torque, the clearance between the internal toothing of the outer hub 13 and the external toothing 7 of the inner hub 1 is used up so that when exceeding this clearance, the idling torsional oscillation damper 25 is bypassed and the load torsional oscillation damper 21 comes into effect. In this case the driven intermediate disc 37 rotates with respect to the two lateral discs 31, 33 and against the force of the helical springs 45 possibly supplemented with friction force of the load friction device 23.

Figure 4 is a partial section through a modified clutch disc assembly, in which the idling torsional oscillation damper 25 is illustrated with the components connected directly thereto. The idling friction device 27 is of particularly simple construction, since in practice it consists solely of the spring

75, which is constructed as a cup spring. This cup spring 75 is fitted by way of internal toothing 77 corresponding to Figure 3, in a non-rotary manner on the extension 8 of the external toothing 7 of the hub 1. The spring 75 is in this case supported in this region axially on the annular disc 59 of the idling torsional oscillation damper 25. On the other side, the spring 75 bears either directly against the annular disc 57 or - like Figure 1 - directly against the rivet heads 69. The spring 75 with its internal toothing 77 is applied axially in the direction of the annular disc 57 to a shoulder 95 of the extension 8 of the external toothing 7, and it is held in this position by the annular disc 59, which likewise with a corresponding internal toothing is fitted in a non-rotary manner on the extension 8 and is held for example by caulking 97. Instead of the caulking 97, another type of attachment may naturally also take place, for example a welded seam.

In Figure 5, in contrast to Figure 4, provided for producing the force of the idling friction device 27 is an undulating spring 93, which is inserted under pretension axially between the two annular discs 57 and 59. In this case, this undulating spring 93 is extended radially inwards and provided with internal toothing 77, which engages in a non-rotary manner with the external toothing 7 in the region of the extension 8. The undulating spring 93 bears on one side against the inner wall of the annular disc 59 and on the other side on the inner wall of the annular disc 57 or - corresponding to Figure 1 - directly on the rivet heads 69.

In the arrangement of the idling friction device 27 according to Figure 6, a spring in the form of a cup spring 65 is provided, which is arranged to be free from forces on its periphery, in that located between the spring 65 and the annular disc 57 is a friction ring 91. The ring 91 has internal toothing on its inner periphery is mounted in a non-rotary manner on the extension 8 of the external toothing 7 of the inner hub 1. The spring 65 thus solely applies an axial force and is supported on the one hand on the friction ring 91 and on the other hand on the annular disc 59. This spring 65 may still engage with tongues pointing radially inwards, in the extension 8 of the external toothing 7, however a torque action in this region is not necessarily provided. The centering of this spring 65 in this case takes place on the inner hub 1. Figure 6 also shows that the rivets 29 may be provided with countersunk rivet heads 71, so that the friction ring 91 may rest on a surface parallel to the inner wall of the annular disc 57. According to the illustration of Figure 6, the spring 65 in the form of a cup spring bears solely with a circular ring contact zone on the friction ring 91. The ring 91 must be made from reinforced synthetic material, in order to be able to introduce and distribute the force better. However, reinforced synthetic material, for example material reinforced with glass fibre has certain drawbacks with regard to the constancy of its frictional force. Accordingly, instead of the friction ring 91 illustrated here, a thrust washer can be provided, which is made for example from metal and which is likewise fitted in a non-rotary manner to the extension 8. In such a construction, a simple friction ring can then be inserted between this metal thrust disc and the annular disc 57. This simple friction ring is then made of a non-reinforced synthetic material whereof the constancy of the frictional value is particularly good. Due to this arrangement, the biasing force of the cup spring 65 is transmitted uniformly to a suitable friction material.

In the construction illustrated in Figure 7, a spring 75 provided for producing the frictional force is in the form of a cup spring, and the friction ring 91, is once again fitted by way of its inner toothing in a non-rotary manner on the extension 8 of the external toothing 7 of the inner hub 1. In the region of its outer diameter, the spring 75 is supported on the friction ring 91 and in the region of its inner diameter in a groove 89, which is located in the extension 8 of the external toothing 7. Due to this construction, the annular disc 59 of the idling torsional oscillation damper 25 is axially free from forces with regard to the idling friction device 27. Due to this construction, the axial attachment between the annular disc 59 and inner hub 1 can be kept simpler.

With substantially the same configuration, Figure 8 shows a somewhat different arrangement for the idling friction device 27. In this case, here as in the preceding Figures, all components which are identical as regards function and external design are provided with the same reference numerals. The idling friction device 27 in Figure 8 consists of a cup-shaped component 79, which bears by its base 81 against the inner wall of the annular disc 59 of the idling torsional oscillation damper 25. The cup-shaped component 79 is fitted by internal toothing 77 in a non-rotary manner on the extension 8 of the external toothing 7 of the inner hub 1. Towards the outside the cup-shaped component 79 is held axially by the annular disc 59. Located somewhat radially inside the cylindrical edge region 83 of the cup-shaped component 79 is an annular ring member 85, which is connected for rotation with the annular disc 57 or the lateral disc 33. In the present case, this connection is produced by way of the rivet heads 69 but other connections can be readily used. Provided between the outer diameter of the ring member 85 and the inner diameter of the edge region 83 of the cup-shaped component 79 is a peripheral annular space, in which a spring 87 is located. This spring 87 may be constructed for example as an undulating spring and be arranged so that, seen in the peripheral direction, it bears alternately against the inner diameter of the edge region 83 and the outer diameter of the annular member 85 under radial pretension and thus produces a frictional force with respect to both parts. However it is also quite possible to construct the spring 87 as an annular spring with a gap or opening on its periphery. Due to its radial inherent tension the spring ring 87 is clamped either on the outer diameter of the ring member 85 or in the inner diameter of the edge region 83, in which case then its entrainment takes place by way of a component which engages in the peripherally open point of this annular spring. Since the force for producing the frictional force acts in the radial direction, this idling friction device 27 is also axially free from forces.

Figure 9 shows a partial section through another clutch disc assembly, which corresponds essentially to the construction according to Figures 1 and 2. Differing from the latter, in this case it is particularly emphasized that the idling friction device 27 is constructed as an independent modular component which can be completely pre-assembled. This means that all the components of the idling friction device 27 are pre-assembled before the final assembly of the clutch disc assembly and can be examined as regards their exact function before the installation. The modular component is inserted axially with clearance between the two annular discs 57 and 59 of the idling torsional oscillation damper 25. The modular component is connected by a part in a non-rotary manner, without clearance, to the extension 8 of the external toothing of the inner hub 1 and by another part to the rivet heads 69 of the rivets 29, which connects the lateral discs 31 and 33 of the load torsional oscillation damper to the outer hub 13. Alternatively, the rivet heads of rivets can be used, which serve to connect the annular disc 57 to the associated lateral disc 33. As depicted the modular component is composed of a sheet member 99, which is provided in its radially outer region with axially extending lugs 107, a friction ring 103 which is connected in a non-rotary manner to the extension 8 of the external toothing, an intermediate ring 105, which is connected in its radially outer region in a non-rotary manner to the lugs 107 and a spring 65 for producing an axial force, which is supported axially on a support ring 101, which is securely connected to the lugs 107. The spring 65 is in this case advantageously fixed radially by the lugs 107 in the region of its outer periphery. The sheet member 99, in conjunction with the support ring 101, forms an axially closed chamber, in which an axial force is produced by the spring 65 for the frictional abutment of the friction ring 103 on the intermediate ring 105. The support ring 101 can in this case also be formed from ends of the lugs 107 bent radially inwards. The sheet member 99 is provided with several openings, into which the rivet heads 69 project. The function of the friction device 27 results from the fact that the sheet member 99 is driven peripherally by way of the rivet heads 69 through the lateral discs 31 and 33, whereas the inner hub 1 - considered as a stationary component -peripherally retains the friction ring 103 by way of the extension 8 of the external toothing. In this case, for the exact fixing of the friction surfaces of the friction ring 103 and intermediate ring 105, the latter is held by way of the lugs 107 of the sheet member 99 in a non-rotary but axially displaceable manner. Due to this arrangement, the spring 65 is also free from the action of torque. The construction of the idling friction device 27 is simple and essentially at least consists solely of an input part, driven by the rivet heads 69, an output part non-rotatably fitted to the extension 8 and a spring. In such an arrangement, the point at which the friction is produced, cannot be accurately foreseen.

Independent of the exact construction of the friction device 27, the latter can be pre-assembled outside the clutch disc assembly and its troublefree operation can be checked. The assembly likewise takes place in a simple manner, since the friction ring 103 is simply pushed onto the extension 8 of the external toothing and the openings in the sheet member 99 are pushed over the rivet heads 69. Due to the axial play between the friction device 27 and the two annular discs 57 and 59, in the final state of the assembly of the clutch disc assembly, the application of the annular disc 59 and its caulking 97 are free from axial forces and non-problematic.

Claims

1. A clutch disc assembly for a motor vehicle friction clutch; said assembly comprising:

an inner hub with internal toothing and external toothing,

an outer hub surrounding the inner hub, the outer hub being equipped with internal toothing engaging in the external toothing of the inner hub, whereby to connect the outer hub in a non-rotary manner to the inner hub but with predetermined rotary clearance;

an entrainment disc able to rotate over a limited angle of rotation relative to the outer hub and provided with clutch friction linings,

a load torsional oscillation damper rated for operation under load, the load damper being equipped with two damper parts able to rotate relative to one other and supported in a resilient rotary manner one against the other by a plurality of springs, one load damper part being connected to the outer hub and the other load damper part being connected to the entrainment disc, and one of the load damper parts comprising two lateral discs arranged at an axial distance apart and connected together and the other load damper part comprising an intermediate disc located between the lateral discs and supported on the lateral discs by way of the springs,

an idling torsional oscillation damper rated for idling operation located axially to the side of one of lateral discs on the side axially remote from the intermediate disc, the idling torsional oscillation damper having two damper parts able to rotate relative to each other and supported in a resilient rotary manner one against the other by way of one or more springs, one idling damper part being connected to the outer hub and the other idling damper part being connected to the inner hub, the two damper parts of the idling torsional oscillation damper being constructed as annular discs, which in the region of their outer periphery act on the spring(s) of the idling torsional oscillation damper, wherein the load torsional oscillation damper employs a load friction device rated for operation under load and the idling torsional oscillation damper employs an idling friction device rated for idling operation, parts of the idling friction device (27) are located axially between the annular discs (57, 59) and radially inside the springs (67), the external toothing (7) of the inner hub (1) between the lateral disc (33) of the load torsional oscillation damper (21) facing the idling torsional oscillation damper (25) and the axially outer annular disc (59) of the idling torsional oscillation damper (25) is extended (8) with a reduced outer diameter and at least one part (73, 75, 85, 91, 93) of the idling friction device (27) engages with internal toothing (77) in a non-rotary manner without clearance for rotary entrainment in the extended external toothing (8) of the inner hub.

2. A clutch disc assembly according to Claim 1, wherein said one part of the idling friction device (27) is constructed as an axially acting spring (75, 93).

3. A clutch disc assembly according to Claim 2, wherein both the annular disc (59) of the idling torsional oscillation damper (25) as well as the axial acting spring (75) are applied axially and attached together to a shoulder (95) of the external toothing (8).

4. A clutch disc assembly according to Claim 1, wherein said one part of the idling friction device (27) is constructed as a friction ring (73), which is loaded by a spring (65) in the direction of the lateral disc (33).

5. A clutch disc assembly according to Claim 1, wherein said one part of the idling friction damper (27) is a thrust washer,

which is located axially between a spring (65) and a friction ring, the spring (65) loading the thrust washer and the friction ring in the direction of the lateral disc (33).

6. A clutch disc assembly according to Claim 4, wherein the spring (65) is constructed as a cup spring located axially between the friction ring (91) and the annular disc (59) and the cup spring is supported axially on the outer periphery of the extension of the external toothing (8) in a groove (89).

7. A clutch disc assembly according to Claim 1, wherein the idling friction device consists of a cup-shaped component (79) with base (81) adjacent to one of the annular discs (59), and an edge region (83) which extends axially in the direction of the other annular disc (57), a ring member (85) which is connected for rotation with the other annular disc (57) and is located essentially in the space radially within the edge region (83) and a radially clamped friction member (87) located between the outer diameter of the ring member (85) and the inner diameter of the edge region (83).

8. A clutch disc assembly according to Claim 7, wherein the friction member is constructed as an undulating spring (87).

9. A clutch disc assembly according to Claim 7, wherein the friction member is constructed as an open clamping ring, which bears with inherent tension against one of the two associated parts on the inside (79) or outside (85) and is controlled by the corresponding upper part (85; 79).

10. A clutch disc assembly according to Claim 1, wherein the parts (65, 99, 103, 105) of the idling friction device (27) are combined as a modular component and can be pre-assembled.

11. A clutch disc assembly according to Claim 10, wherein the modular component is provided with at least two members (103, 105) pretensioned axially one against the other by spring force and outwardly constructed to be free of forces.

12. A clutch disc assembly according to Claim 11, wherein extending into the axial space between the two annular discs (57, 59) are rivet heads (69), which are constructed for the rotary entrainment of at least one other part (99) of the idling friction device (27).

13. A clutch disc assembly according to Claim 12, wherein rivet heads (69) belong to rivets (29), which connect one of the annular discs (57) to the corresponding lateral disc (33) of the load torsional oscillation damper (21).

14. A clutch disc assembly according to Claim 12, wherein the rivet heads (69) belong to rivets (29), which connect the two lateral discs (31, 33) of the load torsional oscillation damper (21) to the outer hub (13).

15. A clutch disc assembly substantially as described with reference to, and as illustrated in any one or more of the Figures of the accompanying drawings.

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Application No:	GB 9823165.7	**Examiner:**	C J Duff
Claims searched:	1 - 15	**Date of search:**	27 May 1999

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): F2U

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Other: On-line: EPODOC, JAPIO, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2292784 A (FICHTEL) Fig 2	
A	GB 2251052 A (FICHTEL) Fig 5	
A	GB 2183790 A (FICHTEL) Whole document	
A	GB 2183787 A (FICHTEL) Whole document	

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