

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a structure of a swing reduction gear for use with a construction equipment of the upper structure revolving type, a cargo handling equipment and so forth.

2. Description of the Prior Art

A swing reduction gear of the type mentioned is conventionally installed, for example, in such a hydraulic shovel as shown Fig. 7. Referring to Fig. 7, the hydraulic shovel includes a lower structure 1, a swing bearing 2, an upper structure 3, and a swing reduction gear 4 mounted on the upper structure 3. The upper structure 3 is mounted for swinging motion on the lower structure 1 by means of, for example, such a swing device as shown in FIG. 8 (see US-A-4797060; US-A-3990939 or US-A-3452624).

Referring to Fig. 8, the swing device generally denoted at 5 is composed of a lower face plate 6 of the upper structure 3, an outer race 8 and an inner race 10 of the swing bearing 2, an upper face plate 9 of the lower structure 1, and rolling bodies 13 of the swing bearing 2 such as steel balls interposed between the outer race 8 and the inner race 10 of the swing bearing 2.

The outer race 8 of the swing bearing 2 is securely mounted on a lower face of the lower face plate 6 of the upper structure 3 while the inner race 10 of the swing bearing 2 is securely mounted on the upper face plate 9 of the lower structure 1, and the outer and inner races 8 and 10 of the swing bearing 2 are assembled for rotation relative to each other by way of the rolling bodies 13. An internal gear wheel 11 is formed on an inner periphery of the inner race 10, and an oil tank 12 is formed between the internal gear wheel 11 and a central upper projection of a plate b secured to the upper face plate 9 of the lower structure 1 and is filled with grease for the lubrication of teeth of the internal gear wheel 11 and a pinion 7 of the swing reduction gear 4. The swing reduction gear 4 is mounted on the lower face plate 6 of the upper structure 3 and the pinion 7 thereof is held in meshing engagement with the internal gear wheel 11 of the swing bearing 2. Consequently, when the pinion 7 is rotated, the upper structure 3 is swung by a reactive force to the force of rotation.

A relationship between the swing bearing 2 and the swing reduction gear 4 is shown more particularly in Fig. 9 which is an enlarged view substantially of an encircled portion A of Fig. 8. Referring to Fig. 9, a sealing collar 15 is secured to a lower bearing 14 which is secured in turn to a casing body of the swing

reduction gear 4. A retainer 17 is securely mounted at a lower end of the casing body 16 by means of a plurality of bolts 18 (only one is shown), and an oil seal 19 is fitted on an inner periphery of the retainer 17. The oil seal 19 has a lip portion 20 normally held in engagement with an outer periphery of the sealing collar 15. A liner member 21 is interposed between the lower bearing 14 and the retainer 17. A seal member 22 is fitted in an annular groove formed on an inner periphery of the sealing collar 15.

An output shaft a of the swing reduction gear 4 is supported for rotation around an axial line 0-0 on the casing body 16 by means of an upper bearing not shown and the lower bearing 14, and the pinion 7 is integrated with the lower end of the output shaft a of the swing reduction gear 4.

Since the retainer 17 on which the oil seal 19 is fitted is securely mounted at the lower end of the casing body 16, the oil seal 19 is mounted on the upper structure 3 side. Meanwhile, since the sealing collar 15 on the upper face side of the pinion 7 is fitted on the output shaft a integrated with the pinion 7, it is rotated in an integrated relationship with the pinion 7. Since the sealing collar 15 is held in close contact over the entire outer periphery thereof with the lip portion 20 of the oil seal 19 and the seal member 22 is provided on the inner periphery of the sealing collar 15, leakage of lubricating oil from within the swing reduction gear 4 is prevented by them.

In the structure described above, starting and stopping of swinging motion of the upper structure 3, which is great in weight and hence in inertia, are carried out all through meshing engagement between the pinion 7 and the internal gear wheel 11 of the inner race 10. Consequently, a high load is applied to faces of mutually contacting teeth of the pinion 7 and the internal gear wheel 11. Besides, the faces of mutually contacting teeth of them are slidably moved relative to each other. Thus, in order to assure a high degree of durability of the tooth faces of them, the annular oil tank 12 is formed between the internal gear wheel 11 of the inner race 10 and the plate b and a suitable amount of grease is filled in the oil tank 12 to lubricate the tooth faces.

Meanwhile, the output shaft a of the swing reduction gear 4 is supported by means of the upper bearing not shown and the lower bearing 14, and the inside of the swing reduction gear 4 including the bearings is held in an enclosed condition and internal components therein are lubricated with different lubricating oil. Therefore, the oil seal 19 is provided between the retainer 17 at the lower portion of the swing reduction gear 4 and the output shaft a which rotates in order to prevent flowing out of the lubricating oil from the swing reduction gear 4 and admission of foreign articles into the swing reduction gear 4 from the outside.

In the swing device described above, the oil seal

and the pinion are located at comparatively near locations relative to each other in order to assure a high strength of the output shaft of the swing reduction gear. Further, since the pinion and the internal gear wheel are held in meshing engagement with each other in the oil tank filled with grease, grease will be squeezed out from between mutually contacting teeth of the pinion and the internal gear wheel.

Then, the grease squeezed out to the oil seal side may push open the dust lip and the seal lip of the oil seal and be admitted into the casing of the swing reduction gear. Consequently, the grease may be mixed with the lubricating oil in the swing reduction gear, which will deteriorate the performance of the lubricating oil. Further, as a result of such admission of the grease, the oil in the swing reduction gear will be increased in amount and may thus be spouted to the outside by way of an oil level gage hole or some other opening portions of the casing, which will have a bad influence on the swing reduction gear and so forth. FR-A-2177399 discloses a swing reduction gear for a swing device. It has a group of floating annular joints performing the function of oil sealing.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a swing reduction gear for a swing device which prevents admission of grease into the same.

It is another object of the present invention to provide a swing reduction gear for a swing device which is reduced in pressing force of grease squeezed out from between mutually meshing teeth of a pinion and an internal gear wheel thereof.

In order to attain the objects, according to the present invention, there is provided a swing reduction gear for a swing device as in claim 1.

With the swing reduction gear, the pressing force of grease squeezed out from between mutually cooperating teeth of the pinion and the internal gear wheel when they are rotated in a mutually meshing condition acts upon the lower face side lip portion of the oil seal. However, since the lower face side lip portion of the oil seal is held in contact with and hence slidably moved on the upper face of the disk-shaped plate, it acts so as to prevent the grease from entering the swing reduction gear. Accordingly, admission of the grease into the swing reduction gear is prevented.

The retainer may have a grease passage formed at a lower end portion thereof for passing therethrough part of grease which is squeezed out from between cooperating teeth of the pinion and the internal gear wheel. Since the position at which grease is squeezed out is a predetermined fixed location with respect to the swing reduction gear, the grease passage is formed at a location of the lower end portion of the retainer which is spaced a little from the predetermined fixed location. Consequently, part of

the grease squeezed out will pass through the grease passage from the lower face side of the oil seal and is returned into the oil tank. As a result, the pressing force of the grease squeezed out as described above is reduced, and admission of the grease into the swing reduction gear is prevented more effectively.

The sealing collar may have a grease passage formed at an inner periphery of a lower end thereof for passing therethrough part of grease which is squeezed out from between cooperating teeth of the pinion and the internal gear wheel. Thus, grease squeezed out to the lower face side of the sealing collar upon rotation of the pinion and the internal gear wheel will pass the upper face side of the pinion and, passing between teeth of the pinion which are not in a meshing condition, is returned into the oil tank. Consequently, the pressing force of grease squeezed out as described above is decreased, and admission of the grease into the swing reduction gear is prevented further effectively.

The above and other objects, features and advantages of the present invention will become apparent from the following description and the appended claims, taken in conjunction with the accompanying drawings in which like parts are denoted by like reference characters all through the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of part of a swing reduction gear according to the present invention;
Fig. 2 is a perspective view of a retainer of the swing reduction gear of Fig. 1;
Fig. 3 is a perspective view of a sealing collar of the swing reduction gear of Fig. 1;
Fig. 4 is a perspective view of a disk-shaped plate of the swing reduction gear of Fig. 1;
Fig. 5 is an enlarged sectional view of an encircled portion B of Fig. 1;
Fig. 6 is a similar view but showing a modified swing reduction gear;
Fig. 7 is a side elevational view of a common hydraulic shovel;
Fig. 8 is a vertical sectional view showing an exemplary one of conventional swing devices; and
Fig. 9 is an enlarged sectional view of an encircled portion A of Fig. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to Fig. 1, there is shown a swing reduction gear for a swing device according to the present invention. The swing reduction gear has somewhat common structure to that of the conventional swing reduction gear shown in Fig. 9, and like parts are denoted by like reference numerals to those of Fig. 9 and overlapping description thereof is omit-

ted herein.

The swing reduction gear is generally denoted at 23 and includes a retainer 24, an oil seal 25 and a sealing collar 27 which are modifications to the retainer 17, oil seal 19 and sealing collar 15, respectively, of the conventional swing reduction gear shown in Fig. 9. The swing reduction gear 23 additionally includes a disk-shaped plate 26. The retainer 24, sealing collar 27 and disk-shaped plate 26 are individually shown in Figs. 2, 3 and 4, respectively, while an encircled portion B of Fig. 1 in which those elements are included is shown in more detail in Fig. 5.

Referring to Fig. 5, the modified oil seal 25 has a lower face side lip portion 29 and is fitted on an inner periphery of the retainer 24 which is mounted on the lower side of the lower bearing 14. The disk-shaped plate 26 is secured to the sealing collar 27 above a pinion 7 by means of a stop ring 30 such that the lower face side lip portion 29 of the oil seal 25 is held in contact with an upper face of the disk-shaped plate 26. In this instance, the stop ring 30 may be secured in a different manner. For example, referring to Fig. 6, the stop ring 30 may be secured between a lower end portion adjacent an outer periphery of a modified sealing collar 27 and an upper face of the pinion 7.

Referring to Figs. 2 and 5, the retainer 24 on which the oil seal 25 is fitted has a grease passage 28 in the form of a radial groove formed at a lower end portion thereof for passing grease therethrough. The grease passage 28 may otherwise be in the form of a radial through-hole formed in a circumferential wall of the oil seal 25.

Referring now to Figs. 3 to 5, a grease passage 31 is formed on the inner periphery at a lower end portion of the sealing collar 27. The grease passage 31 may be such a recessed groove as seen in Fig. 5 which may extend over the entire inner periphery or over part of the inner periphery of the sealing collar 27. It is to be noted that, while the sealing collar 15 of the conventional swing reduction gear shown in Fig. 9 is chamfered at the inner periphery of the lower end thereof adjacent a neck portion of the output power shaft a to the pinion 7 to define a small annular spacing therebetween as seen in Fig. 9, the annular spacing does not have such a function of the grease passage 31 as described hereinbelow.

Referring particularly to Fig. 5, when the pinion 7 and the internal gear wheel 11 are rotated in a mutually meshing condition, grease is first held between adjacent teeth of the pinion 7 and the internal gear wheel 11, and as the teeth come nearer and are finally engaged with each other, the grease is squeezed out from between the teeth. The grease thus squeezed out flows in the direction indicated by an arrow mark c and then partly passes through a gap d between an outer periphery of the disk-shaped plate 26 and an inner periphery of a lower end portion

of the retainer 24 whereafter it moves in the direction indicated by an arrow mark e. Consequently, the pressing force of the grease acts upon the lower face lip portion 29 of the oil seal 25. In this instance, the lower face side lip portion 29 is held in contact with and slidably moved on the upper face of the disk-shaped plate 26 but acts to prevent the grease from entering the swing reduction gear 23. Accordingly, admission of the grease into the swing reduction gear 23 is prevented.

By the way, the position where the pinion 7 and the internal gear wheel 11 mesh with each other and hence where grease is squeezed out when the pinion 7 and the internal gear wheel 11 are rotated in a mutually meshing condition is a particular fixed position with respect to the swing reduction gear 23. In the swing reduction gear of the embodiment, the grease passage 28 is formed at a location of the lower end portion of the retainer 24 which is spaced a little from the particular fixed position. Consequently, part of the grease squeezed out from between cooperating teeth of the pinion 7 and the internal gear wheel 11 is returned from the location near the lower face side lip portion 29 of the oil seal 25 into the oil tank 12 by way of the grease passage 28. Accordingly, the pressing force of the grease acting upon the lower face side lip portion 29 of the oil seal 25 is reduced, and admission of the grease into the swing reduction gear 23 is prevented more effectively.

Besides, the grease passage 31 formed on the inner periphery at the lower end of the sealing collar 27 allows part of the grease squeezed out as described above to flow therethrough along the upper face of the pinion 7 so that the grease thereafter passes between adjacent teeth of the pinion 7 which are not in a meshing condition and is returned into the oil tank 12.

Accordingly, the pressing force of the grease acting upon the lower face side lip portion 29 of the oil seal 25 is reduced, and admission of the grease into the swing reduction gear 23 is prevented further effectively.

Claims

1. A swing reduction gear for a swing device wherein an upper structure on which said swing reduction gear is mounted for swinging movement by way of a swing bearing (2) on a lower structure on which an inner race (10) of said swing bearing (2) is mounted, and a pinion (7) of said swing reduction gear (4) and an internal gear wheel (11) formed on said inner race (10) of said swing bearing (2) are held in meshing engagement with each other in a tank (12) for oil for the lubrication of said swing reduction gear, comprising a casing, an output shaft (a) integrated at a lower end



ted herein.

The swing reduction gear is generally denoted at 23 and includes a retainer 24, an oil seal 25 and a sealing collar 27 which are modifications to the retainer 17, oil seal 19 and sealing collar 15, respectively, of the conventional swing reduction gear shown in Fig. 9. The swing reduction gear 23 additionally includes a disk-shaped plate 26. The retainer 24, sealing collar 27 and disk-shaped plate 26 are individually shown in Figs. 2, 3 and 4, respectively, while an encircled portion B of Fig. 1 in which those elements are included is shown in more detail in Fig. 5.

Referring to Fig. 5, the modified oil seal 25 has a lower face side lip portion 29 and is fitted on an inner periphery of the retainer 24 which is mounted on the lower side of the lower bearing 14. The disk-shaped plate 26 is secured to the sealing collar 27 above a pinion 7 by means of a stop ring 30 such that the lower face side lip portion 29 of the oil seal 25 is held in contact with an upper face of the disk-shaped plate 26. In this instance, the stop ring 30 may be secured in a different manner. For example, referring to Fig. 6, the stop ring 30 may be secured between a lower end portion adjacent an outer periphery of a modified sealing collar 27 and an upper face of the pinion 7.

Referring to Figs. 2 and 5, the retainer 24 on which the oil seal 25 is fitted has a grease passage 28 in the form of a radial groove formed at a lower end portion thereof for passing grease therethrough. The grease passage 28 may otherwise be in the form of a radial through-hole formed in a circumferential wall of the oil seal 25.

Referring now to Figs. 3 to 5, a grease passage 31 is formed on the inner periphery at a lower end portion of the sealing collar 27. The grease passage 31 may be such a recessed groove as seen in Fig. 5 which may extend over the entire inner periphery or over part of the inner periphery of the sealing collar 27. It is to be noted that, while the sealing collar 15 of the conventional swing reduction gear shown in Fig. 9 is chamfered at the inner periphery of the lower end thereof adjacent a neck portion of the output power shaft a to the pinion 7 to define a small annular spacing therebetween as seen in Fig. 9, the annular spacing does not have such a function of the grease passage 31 as described hereinbelow.

Referring particularly to Fig. 5, when the pinion 7 and the internal gear wheel 11 are rotated in a mutually meshing condition, grease is first held between adjacent teeth of the pinion 7 and the internal gear wheel 11, and as the teeth come nearer and are finally engaged with each other, the grease is squeezed out from between the teeth. The grease thus squeezed out flows in the direction indicated by an arrow mark c and then partly passes through a gap d between an outer periphery of the disk-shaped plate 26 and an inner periphery of a lower end portion

of the retainer 24 whereafter it moves in the direction indicated by an arrow mark e. Consequently, the pressing force of the grease acts upon the lower face lip portion 29 of the oil seal 25. In this instance, the lower face side lip portion 29 is held in contact with and slidably moved on the upper face of the disk-shaped plate 26 but acts to prevent the grease from entering the swing reduction gear 23. Accordingly, admission of the grease into the swing reduction gear 23 is prevented.

By the way, the position where the pinion 7 and the internal gear wheel 11 mesh with each other and hence where grease is squeezed out when the pinion 7 and the internal gear wheel 11 are rotated in a mutually meshing condition is a particular fixed position with respect to the swing reduction gear 23. In the swing reduction gear of the embodiment, the grease passage 28 is formed at a location of the lower end portion of the retainer 24 which is spaced a little from the particular fixed position. Consequently, part of the grease squeezed out from between cooperating teeth of the pinion 7 and the internal gear wheel 11 is returned from the location near the lower face side lip portion 29 of the oil seal 25 into the oil tank 12 by way of the grease passage 28. Accordingly, the pressing force of the grease acting upon the lower face side lip portion 29 of the oil seal 25 is reduced, and admission of the grease into the swing reduction gear 23 is prevented more effectively.

Besides, the grease passage 31 formed on the inner periphery at the lower end of the sealing collar 27 allows part of the grease squeezed out as described above to flow therethrough along the upper face of the pinion 7 so that the grease thereafter passes between adjacent teeth of the pinion 7 which are not in a meshing condition and is returned into the oil tank 12.

Accordingly, the pressing force of the grease acting upon the lower face side lip portion 29 of the oil seal 25 is reduced, and admission of the grease into the swing reduction gear 23 is prevented further effectively.

Claims

1. A swing reduction gear for a swing device wherein an upper structure on which said swing reduction gear is mounted for swinging movement by way of a swing bearing (2) on a lower structure on which an inner race (10) of said swing bearing (2) is mounted, and a pinion (7) of said swing reduction gear (4) and an internal gear wheel (11) formed on said inner race (10) of said swing bearing (2) are held in meshing engagement with each other in a tank (12) for oil for the lubrication of said swing reduction gear, comprising a casing, an output shaft (a) integrated at a lower end



thereof with said pinion (7), a lower bearing (13) for supporting said output shaft (a) for rotation on said casing (16), a sealing collar (27) fitted on an outer periphery of said output shaft (a) and located on the upper face side of said pinion (7), a retainer (24) mounted on said casing (16) on the lower side of said lower bearing, an oil seal (25) fitted on an inner periphery of said retainer (24) and having a first region normally held in engagement with an outer periphery of said sealing collar (27), to prevent leakage of lubricating oil for the swing reduction gear (4) characterized in that said oil seal (25) has a lower face side lip portion (29) formed in a second region of the oil seal (25) that is spaced apart from the first region and a disk-shaped plate (26) mounted on an outer periphery of said sealing collar (27) such that said lower face side lip portion (29) of said oil seal (15) is normally held in contact with an upper face of said disk-shaped plate (26) and is so oriented as to be held in contact with said disk-shaped plate (26) by the pressing force of grease squeezed out from the pinion (7) and gear wheel (11) in meshing engagement.

2. A swing reduction gear according to claim 1, wherein said retainer has a grease passage formed at a lower end portion thereof for passing therethrough part of grease which is squeezed out from between cooperating teeth of said pinion (7) and said internal gear wheel (11).
3. A swing reduction gear according to claim 1, wherein said sealing collar (27) has a grease passage (31) formed at an inner periphery of a lower end thereof for passing therethrough part of grease which is squeezed out from between cooperating teeth of said pinion (7) and said internal gear wheel (11).

Patentansprüche

1. Schwenk-Untersetzungsgetriebe für eine Schwenkvorrichtung, wobei ein Oberbau, an dem das Schwenk-Untersetzungsgetriebe befestigt ist, für eine Schwenkbewegung über ein Schwenklager (2) auf einem Unterbau befestigt ist, an dem ein Innenlaufring (10) des Schwenklagers (2) befestigt ist, und ein Ritzel (7) des Schwenk-Untersetzungsgetriebes (4) und ein am Innenlaufring (10) des Schwenklagers (2) ausgebildetes Innenzahnrad (11) in einem Behälter (12) für Öl zur Schmierung des Schwenk-Untersetzungsgetriebes miteinander in Eingriff gehalten werden,

das aufweist:

ein Gehäuse,
eine Abtriebswelle (a), die an ihrem unteren Ende einstückig mit dem Ritzel (7) ausgebildet ist,

ein unteres Lager (13), das die Abtriebswelle (a) für eine Drehung am Gehäuse (16) lagert,

einen Dichtungskragen (27), der auf einen Außenumfang der Abtriebswelle (a) gepaßt ist und sich an der oberen Außenfläche des Ritzels (7) befindet,

einen Abstandshalter (24), der am Gehäuse (16) an der unteren Seite des unteren Lagers befestigt ist,

eine Öldichtung (25), die auf einen Innenumfang des Abstandshalters (24) gepaßt ist und die einen ersten Bereich hat, der mit einem Außenumfang des Dichtungskragens (27) normalerweise in Eingriff gehalten wird, um die Leckage von Schmieröl für das Schwenk-Untersetzungsgetriebe (4) zu verhindern,

dadurch gekennzeichnet, daß

die Öldichtung (25) einen Lippenabschnitt (29) der unteren Außenfläche, der in einem zum ersten Bereich beabstandeten zweiten Bereich der Öldichtung (25) ausgebildet ist, und eine scheibenförmige Platte (26) hat, die an einem Außenumfang des Dichtungskragens (27) in einer solchen Weise befestigt ist, daß der zu der Öldichtung (15) gehörende Lippenabschnitt (29) der unteren Außenfläche normalerweise in Berührung mit einer oberen Fläche der scheibenförmigen Platte (26) gehalten wird und so ausgerichtet ist, daß dieser durch die Druckkraft des Fettes, das vom Ritzel (7) und vom Zahnrad (11), die in Eingriff stehen, herausgedrückt wird, in Berührung mit der scheibenförmigen Platte (26) gehalten wird.

2. Schwenk-Untersetzungsgetriebe nach Anspruch 1, bei dem der Abstandshalter einen Fettkanal hat, der an seinem unteren Endabschnitt ausgebildet ist, damit durch diesen ein Teil des Fettes läuft, das zwischen den ineinandergreifenden Zähnen des Ritzels (7) und des Innenzahnrads (11) herausgedrückt wird.

3. Schwenk-Untersetzungsgetriebe nach Anspruch 1, bei dem der Dichtungskragen (27) einen Fettkanal (31) hat, der an einem Innenumfang seines unteren Endes ausgebildet ist, damit durch diesen ein Teil des Fettes läuft, das zwischen den ineinandergreifenden Zähnen des Ritzels (7) und des Innenzahnrads (11) herausgedrückt wird.



Revendications

1. Démultiplicateur de rotation pour dispositif de mise en rotation dans lequel une structure supérieure sur laquelle ledit démultiplicateur de rotation est monté pour avoir un mouvement de rotation par l'intermédiaire d'un palier de rotation (2) situé sur une structure inférieure sur laquelle est monté un chemin de roulement intérieur (10) dudit palier de rotation (2), et dans lequel un pignon (7) dudit démultiplicateur de rotation (4) et une roue (11) formant engrenage intérieur formé sur ledit chemin de roulement intérieur (10) dudit palier de rotation (2) sont maintenus en engrènement l'un avec l'autre dans un réservoir (12) pour huile destiné à la lubrification dudit démultiplicateur de rotation, comportant un carter, un arbre de sortie (a) venu de matière au niveau de son extrémité inférieure avec ledit pignon (7), un palier inférieur (13) destiné à supporter ledit arbre de sortie (a) pour tourner sur ledit carter (16), un collier d'étanchéité (27) agencé sur une périphérie extérieure dudit arbre de sortie (a) et positionné sur le côté formant face supérieure dudit pignon (7), un dispositif de retenue (24) monté sur ledit carter (16) sur le côté inférieur dudit palier inférieur, un joint pour huile (25) agencé sur une périphérie intérieure dudit dispositif de retenue (24) et comportant une première zone maintenue de manière normale en contact avec une périphérie extérieure dudit collier d'étanchéité (27), pour empêcher une fuite d'huile de lubrification destinée au démultiplicateur de rotation (4), caractérisé en ce que ledit joint pour huile (25) comporte une partie (29) de lèvres côté face inférieure formée dans une seconde zone du joint pour huile (25) qui est écartée de la première zone et une plaque (26) en forme de disque est montée sur une périphérie extérieure dudit collier d'étanchéité (27) de telle sorte que ladite partie (29) formant lèvres côté face inférieure dudit joint pour huile (15) est maintenue de manière normale en contact avec une face supérieure de ladite plaque (26) en forme de disque, et est orientée de manière à être maintenue en contact avec ladite plaque (26) en forme de disque par la force de compression de la graisse chassée depuis le pignon (7) et la roue (11) formant engrenage coopérant par engrènement.
2. Démultiplicateur de rotation selon la revendication 1, dans lequel ledit dispositif de retenue comporte un passage pour graisse formé au niveau d'une partie formant extrémité inférieure de celui-ci pour laisser traverser une partie de la graisse qui est chassée d'entre les dents coopérantes dudit pignon (7) et de ladite roue (11) formant engrenage intérieur.

3. Démultiplicateur de rotation selon la revendication 1, dans lequel ledit collier d'étanchéité (27) comporte un passage (31) pour graisse formé au niveau d'une périphérie intérieure de son extrémité inférieure pour laisser passer une partie de la graisse qui est chassée d'entre les dents coopérantes dudit pignon (7) et de ladite roue (11) formant engrenage intérieur.