

## (12) Indian Patent Application

---

(21) Application Number: 201741011377

(22) Filing Date: 30/03/2017 (43) Publication Date: 05/10/2018

(71) Applicant(s): L & T TECHNOLOGY SERVICES LIMITED

(72) Inventor(s): MOHAMMED, FAISAL

(51) International Classifications: F16D 13/00

(54) Title: AUTO ADJUSTING CLUTCHES

(57) Abstract: Auto adjusting clutches According to an exemplary embodiment of the invention, an automatic adjusting clutch assembly 100 is disclosed. The disclosed clutch assembly 100 includes a pair of substantially circular rings 110, 112. Each ring 110, 112 may have a plurality of evenly arranged ramp surfaces 114, 116 on one side. The rings 110, 112 may be so arranged that the ramp surface 114, 116 of one ring faces the ramp surface of the other ring inside the clutch assembly 100 such that rotation of the one ring 110, 112 relative to the other ring under the influence of a spring force, adjust clutch assembly 100. The clutch assembly 100 further includes a locking arrangement 118 to arrest the relative movement between the pair of rings at a predefined position.

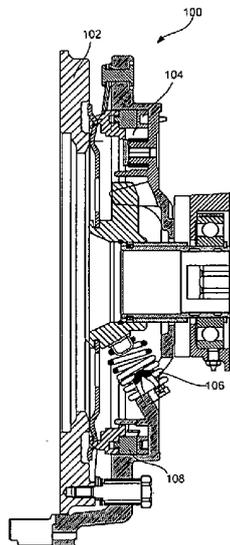


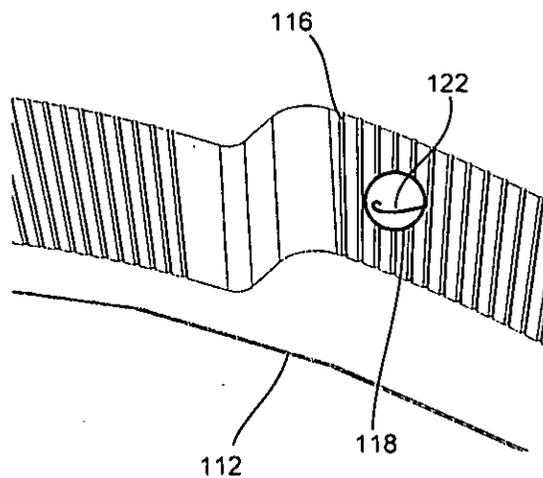
Figure 1

# ABSTRACT



## Auto adjusting clutches

According to an exemplary embodiment of the invention, an automatic adjusting clutch assembly 100 is disclosed. The disclosed clutch assembly 100 includes a pair of substantially circular rings 110, 112. Each ring 110, 112 may have a plurality of evenly arranged ramp surfaces 114, 116 on one side. The rings 110, 112 may be so arranged that the ramp surface 114, 116 of one ring faces the ramp surface of the other ring inside the clutch assembly 100 such that rotation of the one ring 110, 112 relative to the other ring under the influence of a spring force, adjust clutch assembly 100. The clutch assembly 100 further includes a locking arrangement 118 to arrest the relative movement between the pair of rings at a predefined position.



12-Jan-2018/2602/201741011377/Abstract



700203444

We claim:

1. An automatic adjusting clutch assembly 100 comprising:
  - a pair of substantially circular rings 110, 112, each ring having a plurality of evenly arranged ramp surfaces 114, 116 on one side, the rings being so arranged that the ramp surface 114 of one ring 110 faces the ramp surface 116 of the other ring 112 inside the clutch assembly 100, such that rotation of the one ring 110 relative to the other ring 112 under the influence of a spring force, adjust clutch assembly 100; and
  - a locking arrangement 118 to arrest the relative movement between the pair of rings 110, 112 at a predefined position.
  
2. The automatic adjusting clutch assembly as claimed in claim 1, wherein the locking arrangement 118 comprises a shaped projection at the end of the highest point of at least one ramp surface 114, 116 on each ring 110, 112.
  
3. The automatic adjusting clutch assembly as claimed in claim 2, wherein the shaped projection is a hook.
  
4. The automatic adjusting clutch assembly as claimed in claim 1, wherein the locking arrangement 118 comprises a locking slot 120 at the end of the highest point of at least one ramp surface 114 and a hook shaped projection 122 at the end of the highest point of at least one ramp surface 116.
  
5. The automatic adjusting clutch assembly as claimed in claim 4, wherein the hook shaped projection 122 is springy.

PATENT OFFICE CHENNAI 12/2012/2018 15-43

6. The automatic adjusting clutch assembly as claimed in claim 2 or 4, wherein the locking arrangement 118 is provided on all ramp surface 114, 116 on each ring 110, 112.

Dated this 30<sup>th</sup> day of March 2017

  
Mohammed Faisal (INPA No: 1941)  
Head, IPR Dept.  
L&T Technology Services Limited  
DLF 3rd Block, 2nd Floor,  
Manapakkam, Chennai, TN, 600089



**FIELD OF INVENTION**

The present invention relates to automobile clutches in general and more particularly to auto adjusting clutches.

**BACKGROUND**

Clutches are well known mechanisms in automobiles. They are used to connect a driven means and a rotational power source which is usually a crankshaft of an automobile engine. The clutch assembly internal mechanism has to adjust to compensate for the wear on the friction surface in order to work effectively. If the clutch is not adjusted properly, either the clutch will become inoperable resulting in downtime or the clutch would work at a reduced performance.

To compensate wear, a manual or automatic adjuster is generally provided in the clutch assembly. Typically, the manual adjuster will need a continuous monitoring and manpower to perform manual adjustment. There are various designs of automatic wear adjustment mechanism used in the past. Automatic clutch adjusting design includes a pair of circular cam rings connected to each other through a spring arrangement. The rings having a plurality of mutually engaged cam surfaces such that rotation of the one ring relative to the other ring under the influence of spring force, adjust clutch assembly. Though, such auto adjusting mechanisms are substantially effective, however if the cam surface passes beyond maximum allowed height, it may result in failure of clutch assembly. Such situation may occur, if the user does not replace clutch assembly after a prescribed usage.

~~PATENT OFFICE CHECKED 12/2007/2018 15/43~~  
Hence their remains a need for an improved automatically adjustable clutch assembly.

12-Jan-2018/2602/201741011377/Description(Complete)

## **SUMMARY OF THE INVENTION**

According to an exemplary embodiment of the invention, an automatic adjusting clutch assembly is disclosed. The disclosed clutch assembly includes a pair of substantially circular rings. Each ring may have a plurality of evenly arranged ramp surfaces on one side. The rings may be so arranged that the ramp surface of one ring faces the ramp surface of the other ring inside the clutch assembly such that rotation of the one ring relative to the other ring under the influence of a spring force, adjust clutch assembly. The clutch assembly further includes a locking arrangement to arrest the relative movement between the pair of rings at a predefined position.

## **BRIEF DESCRIPTION OF DRAWINGS**

Other objects, features, and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

Figure 1 illustrates a side cross sectional view of an exemplary pull type clutch assembly according to an embodiment of the present invention;

Figure 2 illustrates an isometric view of the rings according to an exemplary embodiment of the invention;

Figure 3 illustrates a partial isometric view of one rings according to an exemplary embodiment of the invention; and

Figure 4 illustrates a partial isometric view of other rings according to an exemplary embodiment of the invention.

## DETAILED DESCRIPTION OF DRAWINGS

The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of exemplary embodiments. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the invention. In addition, descriptions of well-known functions and constructions are omitted for clarity and conciseness.

Referring to figure 1 that illustrates an exemplary pull type clutch assembly 100 according to an embodiment of the present invention. The pull type clutches 100 includes one or more clutch discs, a pressure plate 102, an adjusting ring 104, plurality of pressure springs 106 and an auto adjustment mechanism 108. The clutch assembly 100 is adapted to be mounted on a flywheel, which is mounted on the crankshaft of the engine. The clutch discs are mounted on a splined primary input shaft, which is connected to a gearbox on one side and to the flywheel through a bearing on the other side. The discs are sandwiched between the pressure plate 102 of the clutch assembly 100 and the flywheel. The pressure plate 102 can move axially during the engagement and disengagement of the clutch. As the clutch discs wears, the pressure plate 102 tends to move towards the flywheel. The auto adjustment mechanism 108 operates between the adjusting ring 104 and the clutch cover.

According to an embodiment of the invention, the auto adjustment mechanism 108 may include a pair of substantially circular rings 110, 112. Figure 2 illustrates an isometric view of the rings

110, 112 according to an exemplary embodiment of the invention. Each ring 110, 112 may

have a plurality of evenly arranged ramp surfaces 114, 116 on one side. The rings 110, 112 being so arranged that the ramp surface 114 of first rings 110 faces the ramp surface 116 of the second ring 112 inside the clutch assembly. The arrangement being such that rotation of the first ring 110 relative to the second ring 112 under the influence of a spring force (not shown), adjust clutch assembly by increases a height of the adjustment mechanism 108, resulting in automatically adjustment of the clutches on wear.

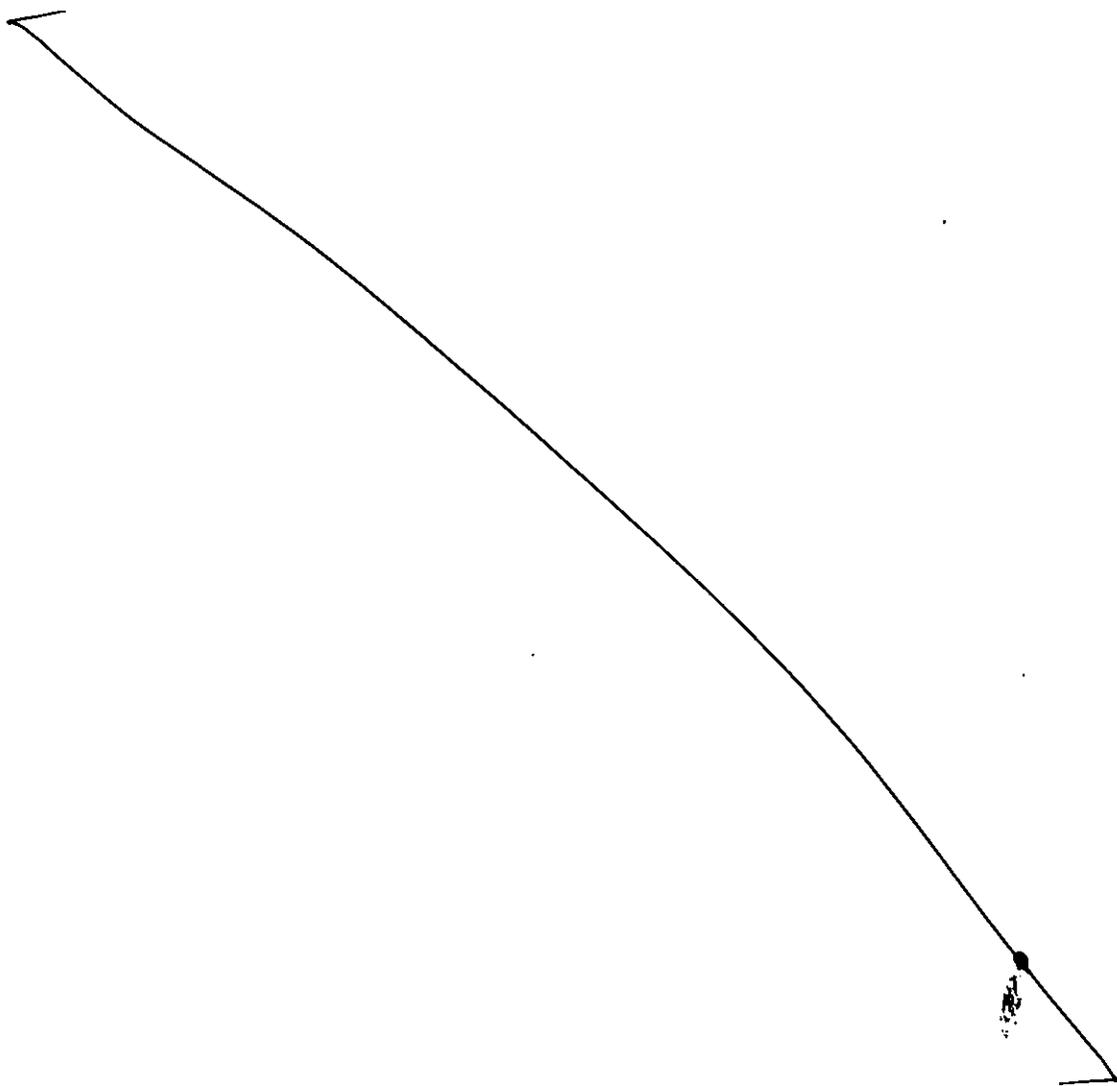
The system further includes a locking arrangement 118 to arrest the relative movement between the pair of rings at a predefined position. According to exemplary embodiments, the locking arrangement 118 may include a shaped projection at the end of the highest point of at least one ramp surface 114 on each ring 110, 112. According to an embodiment, the shaped projection is a hook. The arrangement being such that once the maximum adjustment height is achieved, the hooks get engaged with each other arresting further movement of rings against each other.

Figure 3 and Figure 4 illustrates a partial isometric view of the rings with the locking arrangement according to another exemplary embodiment of the invention. As illustrated in figure 3, the first ring 110 may have a locking slot 120 at the end of the highest point of at least one ramp surface 114. According to exemplary embodiment, the locking slot 120 may be a depression with a pin arranged therein. Further as illustrated in figure 4, the second ring 112 may have a resilient springy hook shaped projection 122 at the end of the highest point of at least one ramp surface 116. The arrangement being such that once the maximum adjustment height is achieved, the hook shaped projection 122 get engaged with the locking slot 120 arresting further movement of rings against each other.

12-Jan-2018/2602/201741011377/Description(Complete)

PATENT OFFICE CHENNAI - 12-01-2018 - 15:43

It is understood that the above description is intended to be illustrative, and not restrictive. It is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined in the appended claims. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein," respectively.



12-Jan-2018/2602/201741011377/Description(Complete)

PATENT OFFICE CHENNAI 12-01-2018 15:43

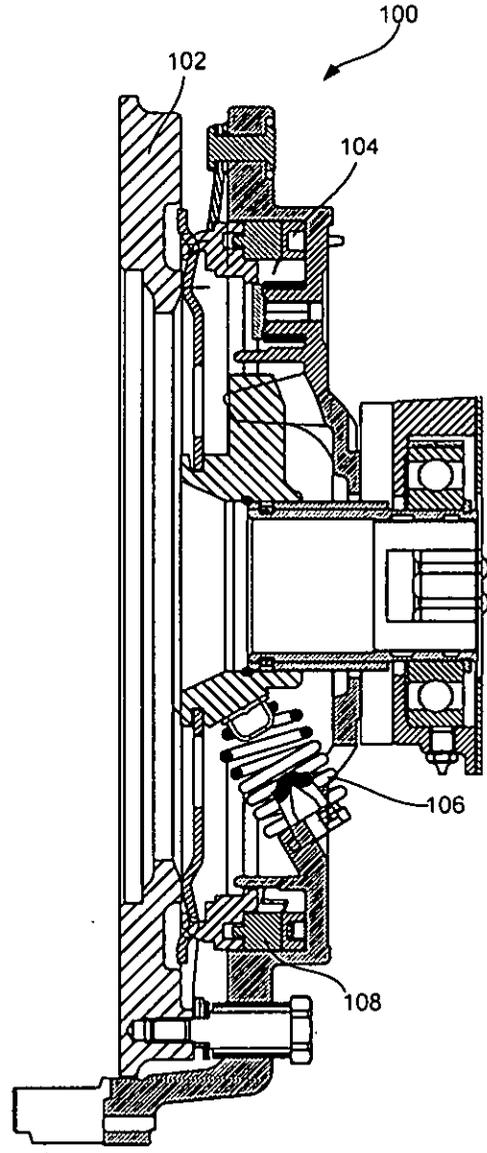


Figure 1

*[Signature]*  
Mohammed Faisal (INPA No: 1941)  
Head, IPR Dept.  
L&T Technology Services Limited  
DLF 3<sup>rd</sup> Block, 2<sup>nd</sup> Floor,  
Manapakkam, Chennai – 600089

12-Jan-2018/2602/201741011377/Drawing

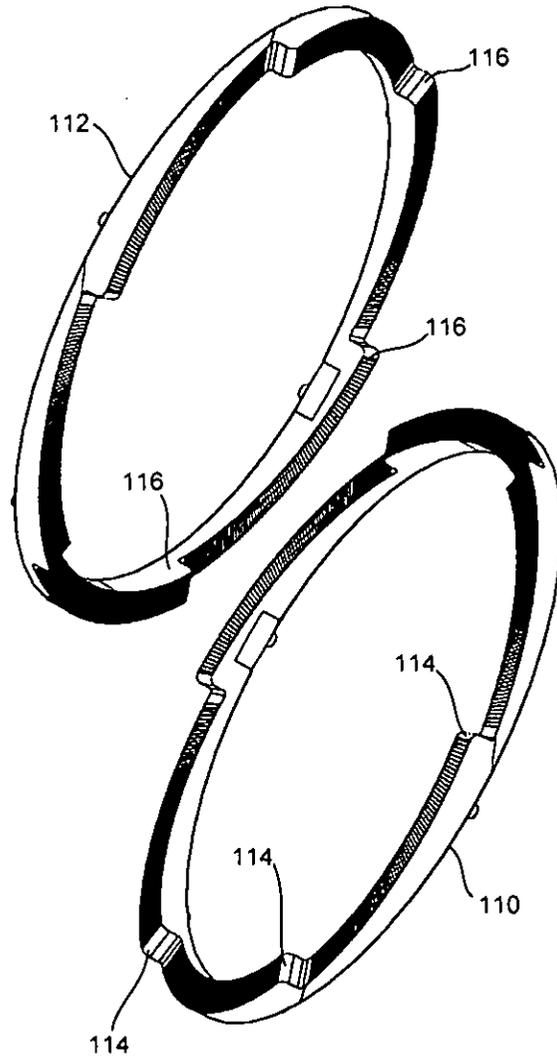
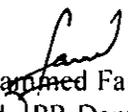


Figure 2

  
Mohamed Faisal (INPA No: 1941)  
Head, IPR Dept.  
L&T Technology Services Limited  
DLF 3<sup>rd</sup> Block, 2<sup>nd</sup> Floor,  
Manapakkam, Chennai – 600089

12-Jan-2018/2602/201741011377/Drawing

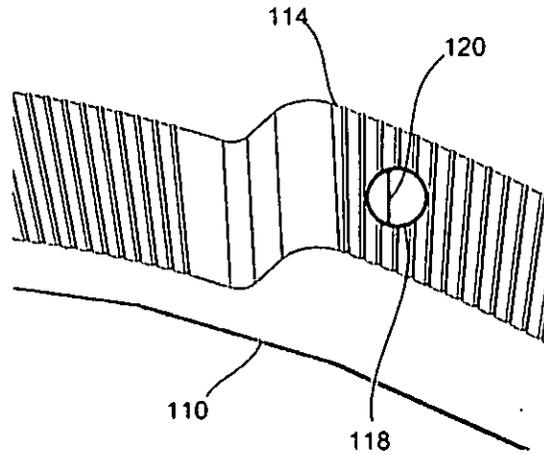


Figure 3

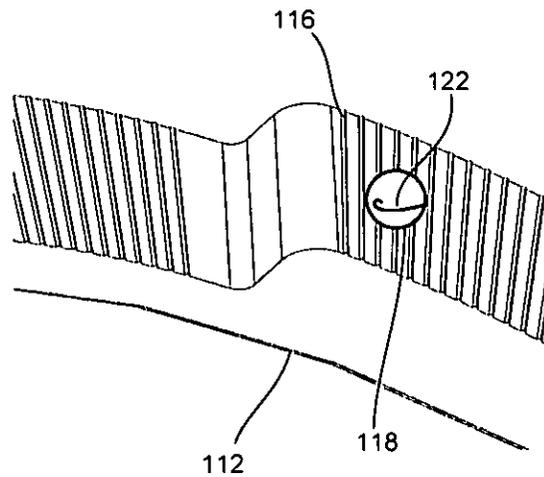
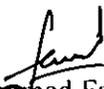


Figure 4

  
Mohammed Faisal (INPA No: 1941)  
Head, IPR Dept.  
L&T Technology Services Limited  
DLF 3<sup>rd</sup> Block, 2<sup>nd</sup> Floor,  
Manapakkam, Chennai – 600089

12-Jan-2018/2602/201741011377/Drawing