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(54) **A connection device for connecting rocker, valve or injection assemblies in internal combustion engines**

(57) A connection device for connecting rocker, valve or injection assemblies in internal combustion engines, comprises a button defining a recess for housing herein an insert coupled to a rocker assembly or the like, the

recess including a lubricating hole and the button comprising a button face contacting a driving plate and including a slot extending radially between the lubricating hole and the outer periphery of the button.

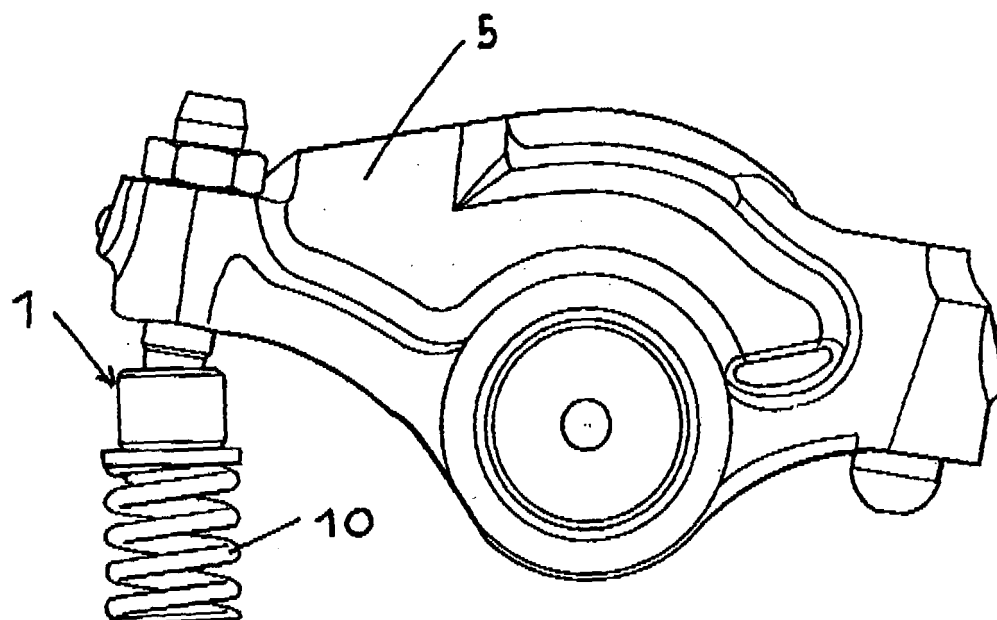


FIG. 1

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a connection device for connecting rocker, valve or injection assemblies in internal combustion engines.

[0002] As is known, in internal combustion engines, both of an Otto cycle type and a Diesel cycle type, the connection between the rocker assemblies and valves, or with the injection assembly, is typically made by a ball coupling allowing force to be transferred to a bottom body, consisting of the valve or injector device.

[0003] The above ball coupling comprises a spherical head screw or insert, including a vertical element coupled to the rocker assembly, for engaging in a recess defined in a button element which, by engaging with a driving plate, allows force to be transferred to a component to be driven, usually comprising the valve or injection assembly, as is shown in figures 1 and 2.

[0004] Said button is held on the insert head portion by a resilient element or O-ring, preventing the button from disengaging from its recess, to be properly mounted on the engine.

[0005] To provide a proper lubricating, and, in particular, a forced lubricating, the rocker conventionally comprises a plurality of throughgoing holes communicating with a further hole formed in the insert leading to the recess, therethrough yet another hole for allowing oil to be directed toward the plate is formed.

[0006] With such an arrangement, lubricating oil is conveyed to the plate through the lubricating hole which is normally axially directed or which, in some cases, is slanted, as shown in figure 3, to facilitate a proper distribution of the lubricating oil due to the natural trend of the button to turn on itself.

[0007] Typically, said button is made by a turning process, or a more inexpensive cold pressing process, and then it being further thermally processed to achieve the desired mechanical properties. Finally, said button is further subjected to optional finishing operations.

[0008] In prior solutions, the provision of the above mentioned slanted lubricating holes allows lubricating oil to be better distributed; however, this arrangement is not compatible with a cold pressing operation, and necessarily requires- a further very expensive turning process.

SUMMARY OF THE INVENTION

[0009] Accordingly, the aim of the present invention is to overcome the above mentioned problem, by providing a connection device for connecting a rocker assembly with a valve assembly, or an injection assembly in an internal combustion engine, allowing the lubricating oil to be optimally distributed even if the device is made by a cold pressing method.

[0010] Within the scope of the above mentioned aim, a main object of the invention is to provide such a con-

nection device which always provide an even distribution of the lubricating oil on contacting surfaces between the button and driving plate.

[0011] Yet another object of the present invention is to provide such a connection device which, owing to its specifically designed construction, is very reliable and safe in operation.

[0012] Yet another object of the present invention is to provide such a connection device which can be easily made starting from easily available elements and materials, and which, moreover, is very competitive from a mere economic standpoint.

[0013] According to the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a connection device for connecting a rocker assembly, a valve assembly or an injection assembly, in an internal combustion engine, said connection device comprising a button defining a recess for receiving an insert coupled to said rocker assembly, said recess having lubricating hole, characterized in that said connection device also comprises, on a face of, said button contacting a driving plate, a slot extending from said lubricating hole to an outer periphery of said button.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of a connection device for connecting a rocker assembly, a valve assembly or an injection assembly in an internal combustion engine, which is illustrated, by way of an indicative, but not limitative example, in the accompanying drawings, where:

Figure 1 is a side elevation view showing the connection device for connecting a rocker assembly, a valve assembly or an injection assembly in an internal combustion engine according to the invention; Figure 2 is a cross sectional view showing a connection assembly of the prior art; Figure 3 is a further cross sectional view showing a prior button element including a slanted hole; Figure 4 is a perspective view showing the button of the connection device according to the present invention; Figure 5 is a cross sectional view showing the connection device according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] With reference to the number references of the above mentioned figures, the connection device for connecting a rocker assembly, a valve assembly or an injection assembly in an internal combustion engine according to the present invention comprises a button, generally indicated by the reference number 1, defining a substan-

tially half-spherical recess 2, for engaging therein a spherical head 3 of an insert or screw 4, to be coupled to a rocker 5.

[0016] Said insert or screw 4 comprises a conventional lubricating duct 6 communicating with a further duct 7 defined in the rocker and leading to the recess where a hole 8 facing to a driving plate 9 associated with a spring 10 for coupling to a valve or an injection assembly is formed.

[0017] The main feature of the invention is that, on the button surface or face contacting the driving plate 9, a slot 20, extending from the hole 8 and leading to the button periphery, is formed.

[0018] The slot 10, which preferably radially extends, operates to facilitate a distribution of oil through the overall contacting surface, owing to the trend of the button to turn on itself, as the engine is operated, thereby spreading lubricating oil through the overall contacting surface.

[0019] Even in a case in which the driving plate is provided with a lubricating hole 11 aligned with the recess hole 8, said slot 20 would allow lubricating oil to be conveyed to the contacting surface, thereby preventing said lubricating oil from directly flowing to the bottom lubricating hole 11.

[0020] Such a distribution or diffusion occurs by a capillarity effect which practically draws lubricating oil from the main duct thereof, even in absence of an upstream overpressure. - -

[0021] In this connection it should be pointed out that the small size of the slot is such as not to considerably increase the contact effort on the remaining contact surface, thereby the original function of the button is held unaltered.

[0022] A further important feature to be stressed is that the slot can be directly made by a cold pressing operation, at a very low cost.

[0023] From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

[0024] In particular, the fact is to be pointed out that the provision of the slot 20, in addition to allowing an even distribution of lubricating oil, also permits to make the subject device at a very low cost.

[0025] The invention, as disclosed, is susceptible to several modifications and variations, all of which will come within the scope of the invention.

[0026] Moreover, all the details can be replaced by other technically equivalent elements.

[0027] In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending to requirements.

comprising a button defining a recess for receiving an insert coupled to said rocker assembly, said recess having a lubricating hole, **characterized in that** said connection device also comprises, on a face of said button contacting a driving plate, a slot extending from said lubricating hole to an outer periphery of said button.

2. A connection device according to claim 1, **characterized in that** said slot extends substantially radially from said lubricating hole.

3. A connection device according to claim 1, **characterized in that** said button is made by a cold pressing process.

4. A connection device according to claim 1, **characterized in that** said slot allows lubricating oil to be distributed by a capillarity effect, with respect to the oil duct communicating with said lubricating hole.

Claims

1. A connection device for connecting a rocker assembly, a valve assembly or an injection assembly, in an internal combustion engine, said connection device

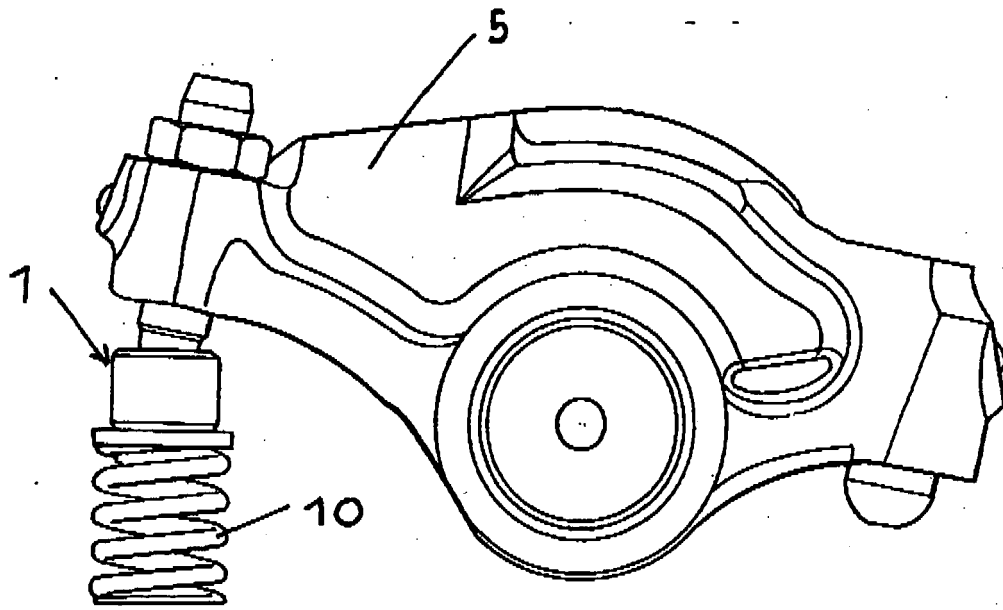


FIG. 1

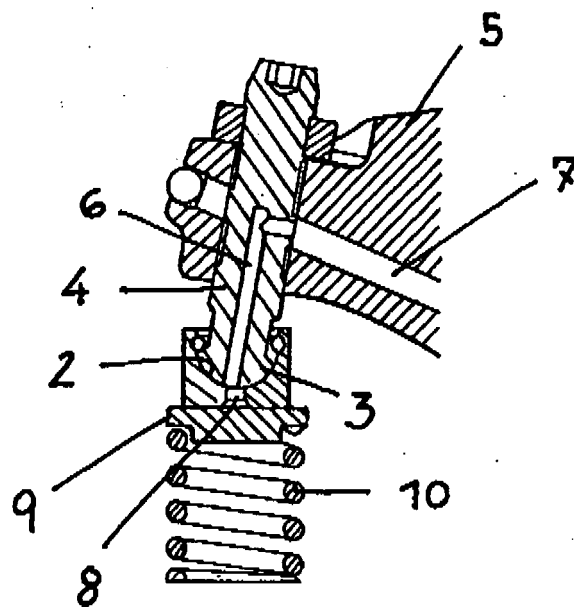


FIG. 2

