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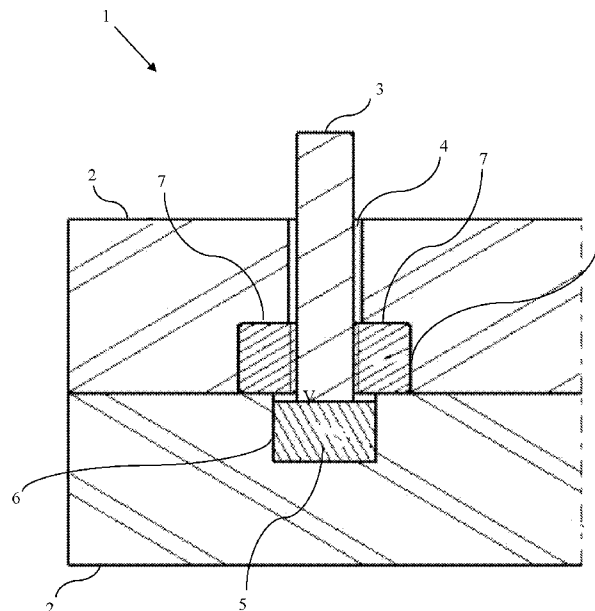
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(54) Title: A BOX

Figure 1



(57) Abstract: The present invention relates to a box (1) where puller inserts (2) are used in order to easily disconnect housings which compose a closed volume by being joined together and wherein pieces particularly such as gear, bearing are included.

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- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

A BOX

5 Technical Field

The present invention relates to a box where puller inserts are used in order to easily disconnect housings which compose a closed volume by being joined together and wherein pieces particularly such as gear, bearing are included.

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Background of the Invention

Gearboxes used in vehicles and contain gears, bearings usually consist of two housings and the said housings are interconnected by means of bolts. Housings are produced by methods such as casting, machining. And it is sometimes required to disconnect the housings and to check the pieces inside the box. Housings which operate with one another for a long time are not easily disconnected due to the fact that the bolts remain under load and also due to the force applied by the bearings inside thereof to the housings from the bearing housings and also the effect of the liquid seal spread between the two housings. Various methods are used to disconnect the housings. One of the said methods is to disconnect the housings by cutting a thread on one of the housings and pulling another bolt inserted into the said thread. Another method is to disconnect the housings by means of special fixtures or apparatus suitable for the lugs placed on the housings. Therefore, today there is a need for a solution whereby it is ensured that housings are easily disconnected without damaging them, by overcoming the above-mentioned problems.

The Chinese patent document no. **CN104132120A**, an application included in the state of the art, discloses a quick-disassembling type gearbox. The gearbox included in the said Chinese patent document comprises a box body, a gear set

and a box cover. The box body and the box cover are fixedly connected through bolts in the gearbox. Therefore, there are threaded screw holes where bolts can pass through in the gearbox cover. Disassembling and assembling transactions are easily carried out by passing bolts through screw holes and via simple wrenches.

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The Chinese utility model document no. **CN216279318U**, another application included in the state of the art, discloses a gearbox. The said gearbox comprises a box body and a top cover located on the top of the box body and there is a groove in the bottom of the top cover. A rotating shaft moves in the top cover groove in order that the top cover can be disassembled and assembled from/to the gearbox body easily in the gearbox and two sleeve plates, which are triggered upon the rotating shaft moves, can enter and exit two grooves located on the box body. Thereby, assembly and disassembly of the cover from/to the box body is performed easily and dust is prevented from getting in.

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Summary of the Invention

An objective of the present invention is to realize a box whereby it is ensured that housings are easily disconnected by means of inserts opening into the housings which compose a closed volume by being joined together and wherein pieces particularly such as gear, bearing are included, and a puller bolt used in connection members which are included in the inserts.

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Detailed Description of the Invention

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“A Box” realized to fulfil the objective of the present invention is shown in the figure attached, in which:

Figure 1 is a cross-section view of the inventive box.

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The components illustrated in the figure are individually numbered, where the numbers refer to the following:

1. Box
- 5 2. Housing
3. Puller member
4. Hole
5. Thrust member
6. First insert
- 10 7. Connection member
8. Second insert

The inventive box (1) for enabling housings to be easily disconnected comprises

- two housings (2) which enable to compose an almost closed volume by
15 being joined together;
- at least one puller member (3) which is used for disconnecting the
housings (2), located in at least one of the housings (2) for this, extends
towards the other housing (2) where no hole (4) is included by entering
through a hole (4) extending almost along the housing (2), and has a
20 threaded structure;
- at least one first insert (6) which is located in the housing (2) where no
hole (4) is included, and wherein there is a thrust member (5) contacted by
the puller member (3); and
- at least one second insert (8) which is located in the housing (2) where the
25 hole (4) is included, whereto the puller member (3) holds on upon entering
through the hole (4), and has a connection member (7) with a threaded
structure that enables the housing (2) comprising the hole (4) to move in
such a way that it will disconnect from the other housing (2) upon it starts
making a rotational motion and its end starts contacting the thrust member
30 (5).

The housings (2) included in the inventive box (1) enable to compose an almost closed volume, which has no contact with the outside, between each other by being closed on top of each other. On one of the housings (2), there is a hole (4) where the threaded puller member (3) makes a rotational motion by entering into it and which extends along the housing (2). The inner surface of the hole (4) has a flat form and does not comprise any thread. The housing (2) containing the hole (4) also comprises a second insert (8) that will be on the part of the hole (4) close to the other housing (2) and be almost concentric with the hole (4), and a connection member (7) that is again concentric with the hole (4) located in the second insert (8). Whereas the other housing (2) included in the inventive box (1) comprises a first insert (6) and a thrust member (5) that can move in the first insert (6) upon the movable puller member (3) contacts.

The puller member (3) included in the inventive box (1) is a bolt and tries to disconnect the housing (2) comprising the hole (4) from the housing (2) whereto it is connected, by applying pressure to the thrust member (5) when it makes a rotational motion in the threaded connection member (7) by means of its threaded structure.

The thrust member (5) included in the invention is a cylinder with flat form and can make a rotational motion in the first insert (6). Upon the thrust member (5) makes an idle motion in the first insert (6), the motion transmitted by the puller member (3) to the thrust member (5) is received. In other words, the thrust member (5) rotates upon the puller member (3) makes a rotational motion.

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In one preferred embodiment of the invention, the connection member (7) is located inside the second insert (8) and it is a square or hexagonal nut with an internal thread. The connection member (7) holds still without moving inside the second insert (8) upon the puller member (3) enters and starts rotating. Thereby, the housing (2) comprising the hole (4) tries to move upwards, upon the rotational motion of the puller member (3) inside the connection member (7) and it applies

pressure to the thrust member (5). The connection member (7) enables to disconnect the housings (2) by transmitting the axial load, that is created upon the puller member (3) is connected and moved, from one flank to the housing (2) where there is a hole (4) and to the other housing (2) from the other flank.

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Moving parts particularly such as gear, bearing are included inside the inventive box (1). When it is desired to disconnect the housings (2) composing the box (1), the puller member (3) is introduced in from the hole (4) and the puller member (3) is made to make a rotational motion inside the connection member (7). As the connection member (7) rotates, it tries to disconnect the housing (2) comprising the hole (4) from the housing (2) whereto it is connected, due to its contact to the thrust member (5) from its end and whereas to the connection member (7) from its lateral surfaces. Thereby, transactions such as opening an aperture on the housings (2) are not necessary anymore in order to disconnect the interconnected housings (2). The housings (2) are disconnected easily, quickly and without being damaged.

With the inventive box (1), it is not necessary anymore cut a thread on the cast housings (2) which have long and expensive production processes and usually have a complex structure. On the other hand, since the connection member (7) does not make a rotational motion inside the second insert (8) in terms of shape, it does not transmit the torque based on shape. In addition, it is avoided to damage the housing (2) where the thrust member (5) is included. Upon the box is subjected to an assembly and disassembly process continuously, the thrust member (5) and the connection member (7) are damaged, not the housings (2). Thereby, it will be continued to use the housings (2) by replacing only the said members.

Within these basic concepts; it is possible to develop various embodiments of the inventive "Box (1)"; the invention cannot be limited to examples disclosed herein and it is essentially according to claims.

CLAIMS

1. A box (1) for enabling housings to be easily disconnected, **characterized by**
- 5 - two housings (2) which enable to compose an almost closed volume by being joined together;
- at least one puller member (3) which is used for disconnecting the housings (2), located in at least one of the housings (2) for this, extends towards the other housing (2) where no hole (4) is included
- 10 by entering through a hole (4) extending almost along the housing (2), and has a threaded structure;
- at least one first insert (6) which is located in the housing (2) where no hole (4) is included, and wherein there is a thrust member (5) contacted by the puller member (3); and
- 15 - at least one second insert (8) which is located in the housing (2) where the hole (4) is included, whereto the puller member (3) holds on upon entering through the hole (4), and has a connection member (7) with a threaded structure that enables the housing (2) comprising the hole (4) to move in such a way that it will
- 20 disconnect from the other housing (2) upon it starts making a rotational motion and its end starts contacting the thrust member (5).
2. A box (1) according to Claim 1; **characterized by** the housing (2) on one
- 25 of which there is a hole (4) where the threaded puller member (3) makes a rotational motion by entering into it and which extends along itself.
3. A box (1) according to Claim 1 or 2; **characterized by** the hole (4) the inner surface of which has a flat form and does not comprise any thread.
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4. A box (1) according to any of the preceding claims; **characterized by** the housing (2) which comprises a second insert (8) that will be on the part of the hole (4) close to the other housing (2) and be almost concentric with the hole (4), and a connection member (7) that is again concentric with the hole (4) located in the
5 second insert (8).

5. A box (1) according to any of the preceding claims; **characterized by** the other housing (2) which comprises a first insert (6) and a thrust member (5) that can move in the first insert (6) upon the movable puller member (3) contacts.
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6. A box (1) according to any of the preceding claims; **characterized by** the puller member (3) which is a bolt and tries to disconnect the housing (2) comprising the hole (4) from the housing (2) whereto it is connected, by applying pressure to the thrust member (5) when it makes a rotational motion in the
15 threaded connection member (7) by means of its threaded structure.

7. A box (1) according to any of the preceding claims; **characterized by** the thrust member (5) which is a cylinder with flat form and can make a rotational motion in the first insert (6).
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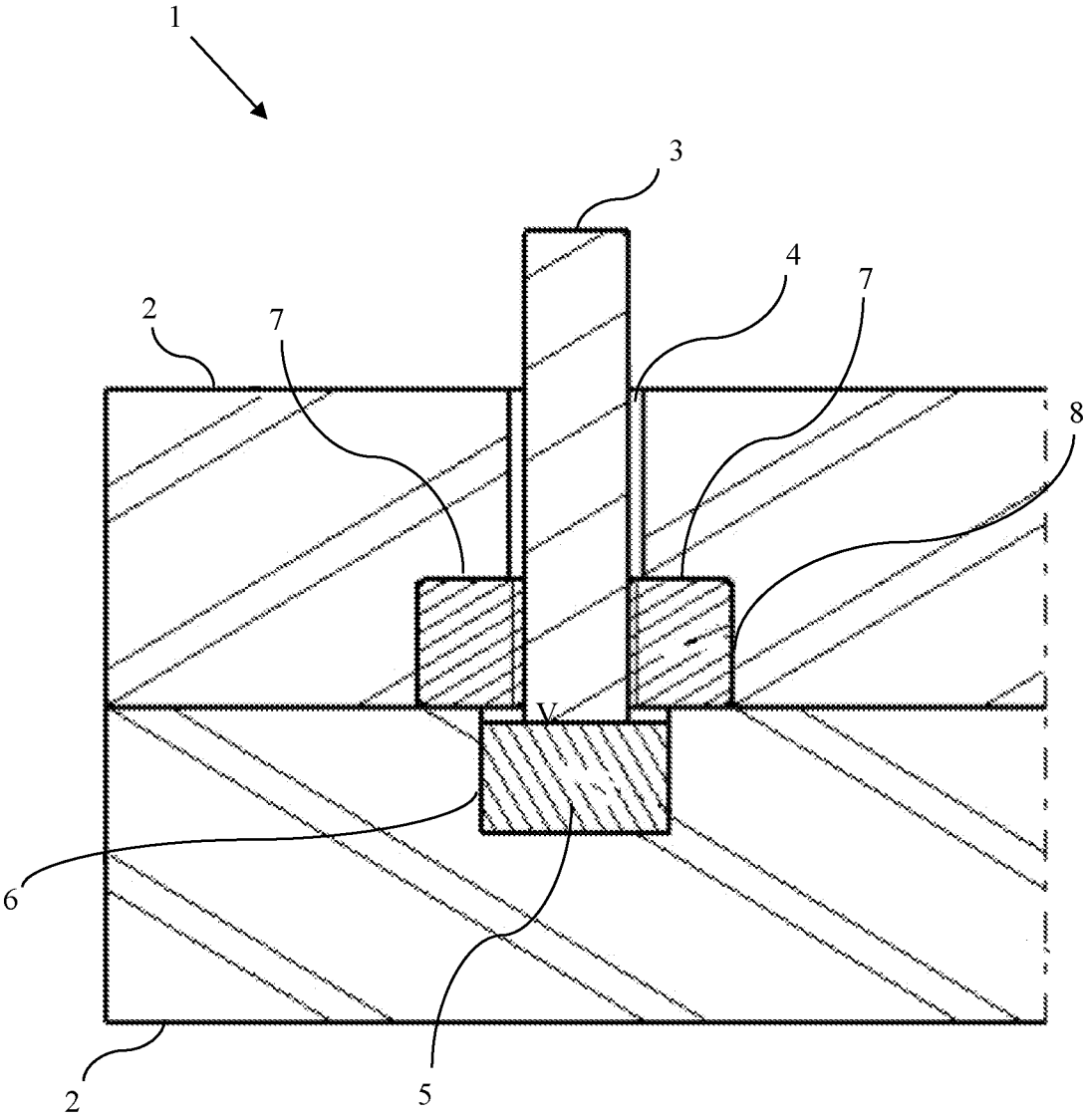
8. A box (1) according to any of the preceding claims; **characterized by** the thrust member (5) which rotates upon the puller member (3) makes a rotational motion.

25 9. A box (1) according to any of the preceding claims; **characterized by** the connection member (7) which is located inside the second insert (8) and is a square or hexagonal nut with an internal thread.

10. A box (1) according to any of the preceding claims; **characterized by** the
30 connection member (7) which holds still without moving inside the second insert (8) upon the puller member (3) enters and starts rotating.

11. A box (1) according to any of the preceding claims; **characterized by** the connection member (7) which enables to disconnect the housings (2) by transmitting the axial load, that is created upon the puller member (3) is connected
5 and moved, from one flank to the housing (2) where there is a hole (4) and to the other housing (2) from the other flank.

Figure 1



INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR2023/051385

A. CLASSIFICATION OF SUBJECT MATTER

F16H 57/02 (2012.01)i; F16H 57/031 (2012.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F16H 57/02; F16H 57/031

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

TURKPATENT Database

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, Google Patents, Turkish National Patent Database, IEEE, ScienceDirect EPO Abstract & Fulltext Databases & Keywords Keywords: "box, hous+,cover,lid,fasten,split,disassambl+,assembl+"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 202392081 U (DONGFANG WANG) 22 August 2012 (2012-08-22) Abstract, drawing:1 ,	1-11
A	CN 202914689 U (XIONG YINGYING) 01 May 2013 (2013-05-01) Abstract, drawing : 1	1-11
A	CN 111765237 A (SHENGRUI TRANSMISSION CO LTD) 13 October 2020 (2020-10-13) Abstract, drawing : 1, claims: 1,2	1-11



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

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Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	202392081	U	22 August 2012	NONE			
CN	202914689	U	01 May 2013	NONE			
CN	111765237	A	13 October 2020	CN	111765237	B	22 December 2020