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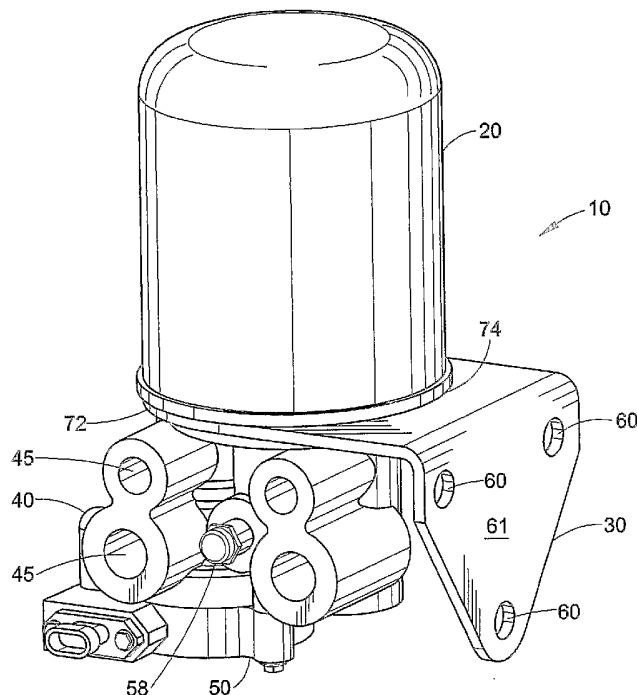
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(54) Title: REMOTE PURGE DRYING UNIT FOR COMPRESSED GAS



(57) Abstract: An air dryer assembly (10) and mounting bracket (30) for mounting an air dryer to a vehicle. The air dryer assembly (10) has a manifold (40) and a canister (20) which seal against the surface of the mounting bracket (830). Orientation pegs (69) are provided along the sealing surface of the air dryer manifold (40) and receive corresponding indented regions (66) in a cut out region (64) in the mounting bracket (30). By providing a number of orientation pegs (69) on the surface of the manifold (40), a number of mounting orientations for the air dryer (10) assembly can be achieved.

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REMOTE PURGE DRYING UNIT FOR COMPRESSED GAS

FIELD OF THE INVENTION

[0001] This invention generally relates to an air dryer and more specifically to a method and system for mounting a remote purge air dryer used in an air braking system.

BACKGROUND OF THE INVENTION

[0002] In compressed air braking systems, such as those used on commercial vehicles, an air dryer is typically placed in line after the compressor and prior to the rest of the components, such as the compressed air reservoir or air brake units. The air dryer removes harmful contaminants, such as dirt, oil, oil vapor, water and water vapor, from the compressed air, and thus provides clean, dry air to the components of the brake system. Clean dry air increases the reliability and life of the brake system, thereby reducing maintenance costs.

[0003] A typical air dryer used in air braking systems contains a desiccant canister, which includes an oil separator and a desiccant material that adsorbs water as the compressed air passes through it. The desiccant material can be regenerated by reversing the air flow and purging the material with dry air supplied from a purge air volume. As the dry air passes through the desiccant material the moisture that was previously adsorbed from the compressed air is transferred back to the air and expelled through an exhaust port.

[0004] The purge volume may be either coupled with the brake system reservoir or contained in a separate purge air reservoir. Air dryers with a separate purge air reservoir may be either integrated or remote. An integrated air dryer system, such as the Bendix AD-IS air dryer, has an air dryer with a self contained purge reservoir tank. A remote purge volume air dryer has the purge air reservoir located remotely from the air dryer.

[0005] Remote purge volume air dryers are typically preferred over integrated air dryers, since integrated air dryers tend to be larger and more expensive to make. In addition, the size of an integrated air dryer limits the available mounting areas on the vehicle. In addition to the size of the air dryer, other factors contribute to the limited available mounting area. For example, the air dryer must be located far enough away from the compressor so that the temperature at which the air dryer will effectively remove moisture is not exceeded. Furthermore, the air line from the air compressor to the air dryer must slope downward and have as few bends as possible to prevent water from being trapped in the air line and freezing. Thus, it is desirable to have an air

dryer that does not use brake system air for its purge cycle and can be easily mounted in a variety of locations.

[0006] In addition to the limited mounting location available, current air dryers also have predefined mounting orientations. This is because the air dryers either have mounting holes built into the dryer body, or are provided with standard mounting brackets. As a result, the air dryer can only be mounted in one position. Thus, some air dryers require multiple mounting brackets to be made and stored to facilitate the various mounting positions required by the different types of vehicles.

[0007] Furthermore, air dryer canisters have a limited useful life and can only be regenerated a certain number of times before requiring replacement. To facilitate the periodic replacement of the air dryer canister, a convenient mounting location is desirable.

SUMMARY OF THE INVENTION

[0008] A method and apparatus for mounting an air dryer assembly to a vehicle in one of several possible mounting orientations is provided.

[0009] In one embodiment of the present invention, an air dryer manifold is secured to an air dryer canister with a bracket located therebetween. In this embodiment, orientation pegs located adjacent to the sealing surface of the air dryer manifold are received by a set of corresponding indented regions located in a cut away region of the mounting bracket.

[0010] Another aspect of the present invention is a method of mounting an air dryer to a vehicle. In one embodiment of this invention, a mounting bracket having a recess therein is placed over a protrusion on an air dryer manifold. The mounting bracket is rotated to a desired mounting orientation and secured into such orientation by a set of orientation pegs located adjacent to the sealing surface of the air dryer manifold. An air dryer canister is then fastened to the air dryer manifold protrusion, sealing the mounting bracket therebetween.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] In the accompanying drawings, which are incorporated in and constitute a part of the specification, embodiments of the invention are illustrated, which together with the general description of the invention given above, and the detailed description given below, serve to exemplify the principles of this invention.

[0012] Figure 1 is a perspective view of an air dryer incorporating a desiccant canister and a mounting bracket.

[0013] Figure 2 is an exploded view of an air dryer incorporating a desiccant canister and a mounting bracket.

[0014] Figure 3 is a perspective view of a mounting bracket.

[0015] Figure 4 is a perspective view of an air dryer of the present invention.

[0016] Figure 5 is a perspective view of an air dryer of the present invention wherein the sealing surface of the air dryer is shown.

DETAILED DESCRIPTION

[0017] With reference to Figure 1, an air dryer assembly, generally referenced as **10**, includes an air dryer canister **20**, a mounting bracket **30**, and an air dryer manifold **40**. As best shown in Figure 2, the air dryer canister **20** is a conventional canister with a set of threads running through an opening on the underside of the cartridge that receives a set of mating threads **42** protruding from the center of the air dryer manifold **40**. Preferably, but not necessarily, the threads **42** are between 36 mm and 50 mm. In one embodiment, the threads **42** are 41 mm, while in another embodiment, the threads are 42 mm. Optionally, an adapter can be used to make the canister **20** with 50 mm threads **42** adapt to 39mm standard threads, for example. The air dryer manifold **40** can have any number of inlet and outlet ports **45**, four such ports are shown in Figure 2. In one embodiment, the air dryer manifold **40** includes a purge valve **50**, a check valve **54**, a safety release valve **58**, or some combination thereof. The air dryer manifold **40** can be made entirely from plastic or it can be made from plastic with metallic inserts. Examples of the plastic that can be used to make the air dryer manifold **40** include Nylon 6, Delrin or acetel.

[0018] Referring now to Fig. 3, the mounting bracket **30**, is fastened to a vehicle frame in the desired location. In one embodiment, the mounting bracket **30** is formed from stamped steel and is bolted to the frame through mounting holes **60** located on the side surface **61** of the mounting bracket **30**. The mounting bracket **30** has a cut out portion **64** along the top surface **65** that receives the protruding threads **42** from the air dryer manifold **40**. In one embodiment, the side surface **61** and the top surface **65** are connected to form an approximate right angle. However, one skilled in the art should appreciate that the angle may be more or less than 90°, depending on the desired mounting orientation of the air dryer assembly **10**.

[0019] The cut out portion 64 contains a number of indented portions 66 for receiving orientation pegs 69 located adjacent to the sealing surface 70 of the air dryer manifold 40. Each of the orientation pegs 69 are secured against a corresponding indented portion 66, thereby defining and securing the rotative orientation of the mounting bracket 30 relative to the air dryer manifold 40. When the orientation pegs 69 and corresponding indented portions 66 of the mounting bracket 30 are uniformly positioned about the cut out portion 64 of the mounting bracket 30, the air dryer manifold 40 can to be oriented in a plurality of rotative positions with respect to the mounting bracket 30. The ability to rotate the mounting bracket 30 relative to the air dryer manifold 40 permits the inlet and outlet ports 45 to be positioned in a plurality of positions, thereby expanding the possible mounting locations for the air dryer assembly 10. Since the preferred positioning of the air dryer assembly 10 is often dependent upon the vehicle manufacture, it is desirable to allow for a plurality of mounting orientations for the air dryer assembly 10. In the embodiment illustrated in Figures 2 and 3, the cut out portion 64 is provided with eight uniformly-spaced indented portions 66, thereby defining an octagonal cut out portion. In this embodiment, the air dryer manifold 40 can be secured to the mounting bracket 30 in eight different orientations, each separated by 45 degrees. It should be appreciated that the number of orientation pegs 69 located on the sealing surface 70 of the air dryer manifold 40, and the number of corresponding indented portions 66, may vary depending on the number of mounting orientations that are desired. Additionally, it should be appreciated that the mounting bracket 30 could have the orientation pegs 69 located on the bottom side 72 that are received in uniformly spaced holes in the sealing surface 70.

[0020] Referring now to Figure 5, the sealing surface 70 of the air dryer manifold 40 is preferably substantially flat with a recess 75 that accepts a seal (not shown) therein. The air dryer canister 20 has a recess to accept a seal along the sealing surface 74. In order to secure the air dryer canister 20 onto the air dryer manifold 40, the cut out portion 64 of the mounting bracket 30 is slipped over the protruding threads 42 of the air dryer manifold 40 such that the orientation pegs 69 located on the manifold sealing surface 70 are fit into the corresponding indented portions 66 of the cut out portion 64 to provide to desired rotative orientation of the air dryer manifold 40 to the valve mounting bracket 30. The air dryer canister 20 is then threaded onto the protruding threads 42 of the air dryer manifold 40. As the air dryer canister 20 is threaded down onto the air dryer manifold 40, the mounting bracket 30 is clamped between the sealing surfaces 70 and 74 of the manifold and canister, respectively. The seals located along the sealing surfaces 70 and 74 compress on the mounting bracket 30 and form an air tight seal.

[0021] Since the operation of the air dryer does not depart from the air dryers described in the prior art, a description of such has been omitted.

[0022] Use of the mounting bracket **30** and the above-mentioned sealing arrangement allows the air dryer to be mounted without requiring an intermediate bracket typically fabricated by the customer. This feature reduces the cost associated with the air dryer system and provides for easier installation, removal, and orientation of the air dryer.

[0023] It will be appreciated that the air dryer assembly may adopt a wide variety of configurations. This invention is intended to include such modifications and alterations in so far as they fall within the scope of the appended claims or the equivalents thereof.

CLAIMS:

What is claimed is:

1. An air dryer assembly comprising:
a dryer manifold having a sealing surface and a plurality of orientation pegs located thereon;
a canister connectable to said manifold;
and a mounting bracket having a recess, wherein said recess has a set of indented regions positioned to receive said orientation pegs.
2. The air dryer assembly of claim 1, wherein said plurality of orientation pegs are located adjacent to said sealing surface of said dryer manifold.
3. The air dryer assembly of claim 1 further comprising a first seal disposed between the dryer manifold and one surface of said mounting bracket.
4. The air dryer assembly of claim 3 further comprising a second seal disposed between the canister and a second surface of the mounting bracket.
5. The air dryer assembly of claim 1 further comprising a check valve, a purge valve and a safety release valve.
6. The air dryer assembly of claim 1, wherein the number of orientation pegs and corresponding indented regions is eight.
7. The air dryer assembly of claim 1, wherein said orientation pegs are uniformly placed around the sealing surface of the manifold.
8. The air dryer assembly of claim 1 further comprising a threaded protrusion located on the dryer manifold that mates with a corresponding threaded region on said canister.
9. The air dryer assembly of claim 8, wherein said recess of said mounting bracket receives the threaded protrusion located on the dryer manifold.

10. The air dryer assembly of claim 1, wherein said mounting bracket further comprising a first surface and a second surface connected to said first surface at an angle of approximately 90 degrees.
11. The air dryer assembly of claim 1, wherein said sealing surface is substantially flat.
12. The air dryer assembly of claim 8, further comprising an adapter that is threaded onto said threaded protrusion of said dryer manifold and receives the threaded region of said canister through a set of corresponding threads.
13. The air dryer assembly of claim 8, wherein the threads are between about 36 mm and 50 mm.
14. The air dryer assembly of claim 8, wherein the threads are 42 mm.
15. An air dryer assembly comprising:
 - an air dryer manifold with canister secured thereto; and
 - a mounting bracket with a means for providing a plurality of mounting orientations of said air dryer manifold relative to said mounting bracket; wherein said mounting bracket includes a portion that is received between said air dryer manifold and said canister.
16. An air dryer assembly comprising:
 - a dryer manifold;
 - a canister connectable to said manifold;
 - a mounting bracket; and
 - a plurality of orientation pegs that engage the mounting bracket at different locations to provide for different orientations of the manifold relative to the mounting bracket.
17. An air dryer assembly comprising:
 - an air dryer manifold with desiccant canister secured thereto; and
 - a mounting bracket mountable to said air dryer manifold between said manifold and said canister in a plurality of mounting orientations.

18. An air dryer assembly comprising:
 - an air dryer manifold including a threaded region for securing a desiccant canister with a mating set of threads; and
 - a mounting bracket,wherein said canister includes a sealing surface which contacts said mounting bracket.
19. The air dryer assembly of claim 18, wherein said threaded region includes 42 mm threads.
20. The air dryer assembly of claim 18, wherein said sealing surface includes an o-ring that seals against said mounting bracket.
21. An air dryer assembly comprising:
 - a cartridge;
 - a manifold; and
 - a mounting bracket, wherein said manifold and said cartridge are secured to said mounting bracket by a compressive force formed between said cartridge and said mounting bracket.
22. The air dryer assembly of claim 21, wherein said cartridge is threadably engaged by said manifold.
23. An air dryer assembly comprising:
 - a canister including a sealing surface;
 - a manifold; and
 - a mounting bracket, wherein said manifold includes a sealing surface that is smaller in diameter than the sealing surface of the canister.
24. The air dryer assembly of claim 23, wherein the manifold sealing surface is secured against a first side of said mounting bracket and the canister sealing surface is secured against a second side of said mounting bracket.
25. An air dryer assembly comprising:
 - a dryer manifold having a sealing surface and a plurality of orientation pegs located thereon;
 - a canister connectable to said manifold; and
 - a mounting bracket having a means for receiving said orientation pegs,

wherein said mounting bracket further comprising a first surface and a second surface connected to said first surface at an angle of approximately 90 degrees.

26. The air dryer assembly of claim 25, wherein said manifold sealing surface is secured against a first side of said first surface of said mounting bracket.

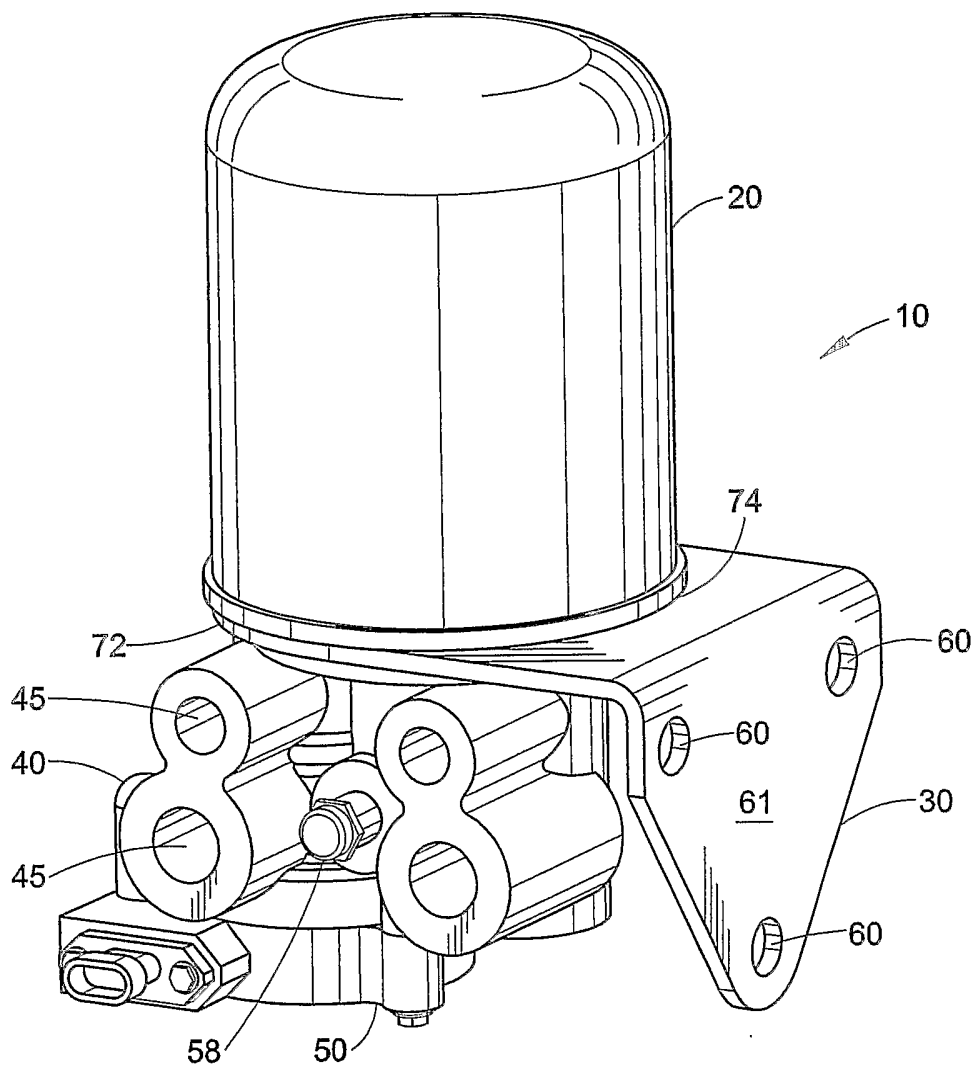


FIG. 1

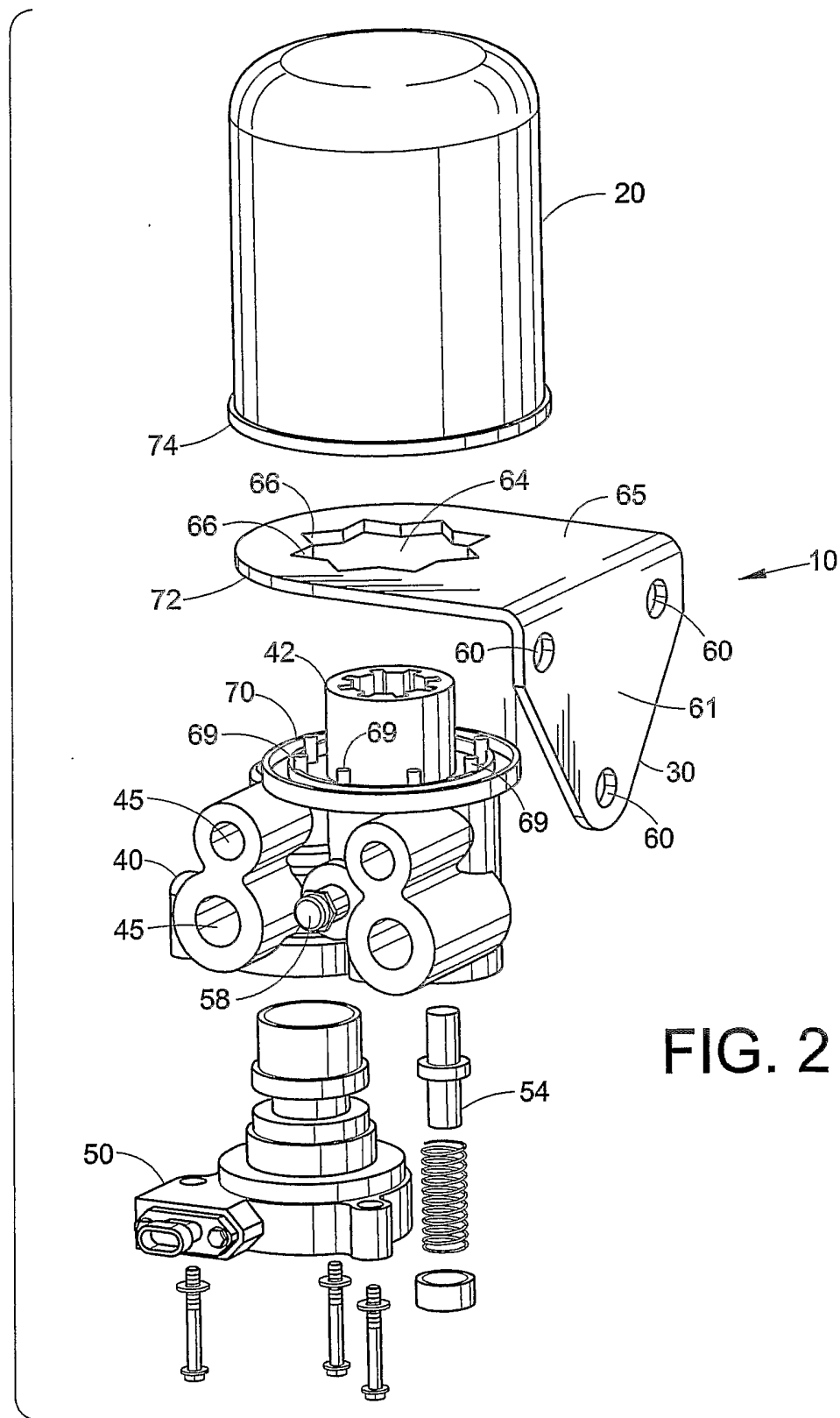


FIG. 2

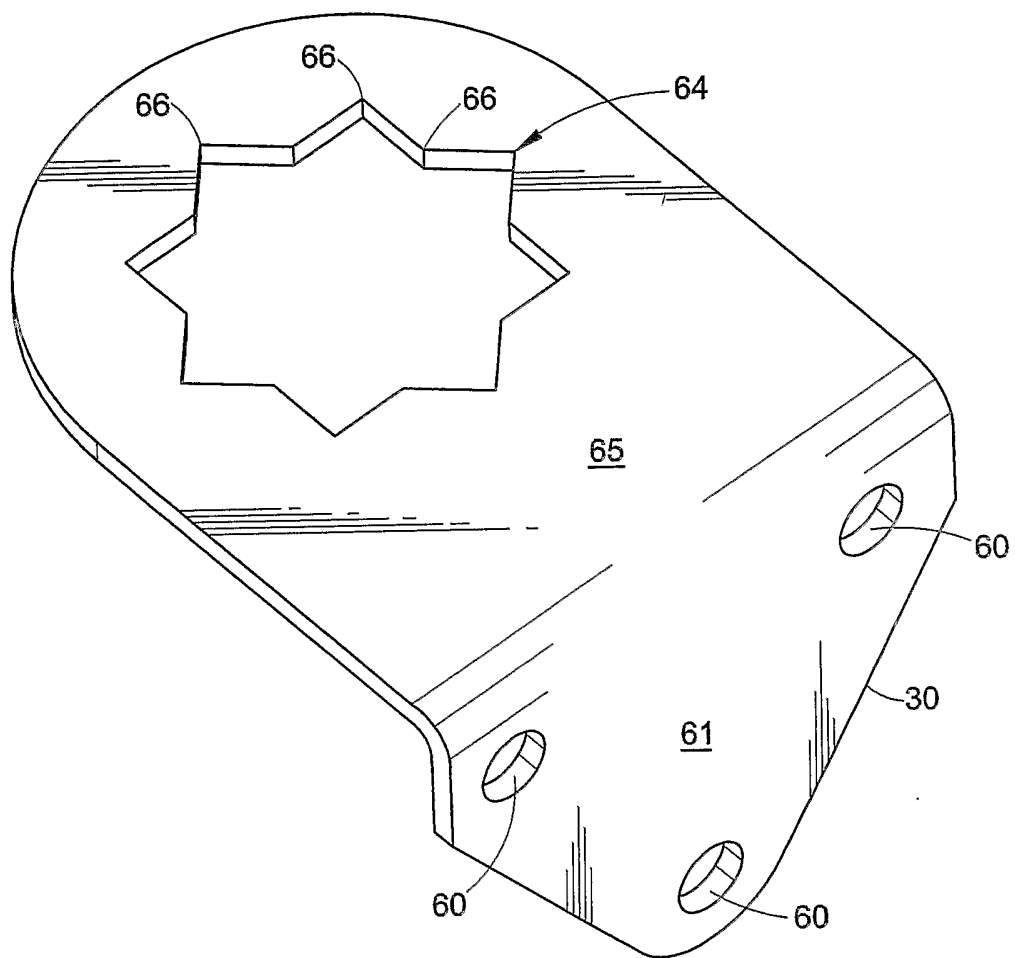


FIG. 3

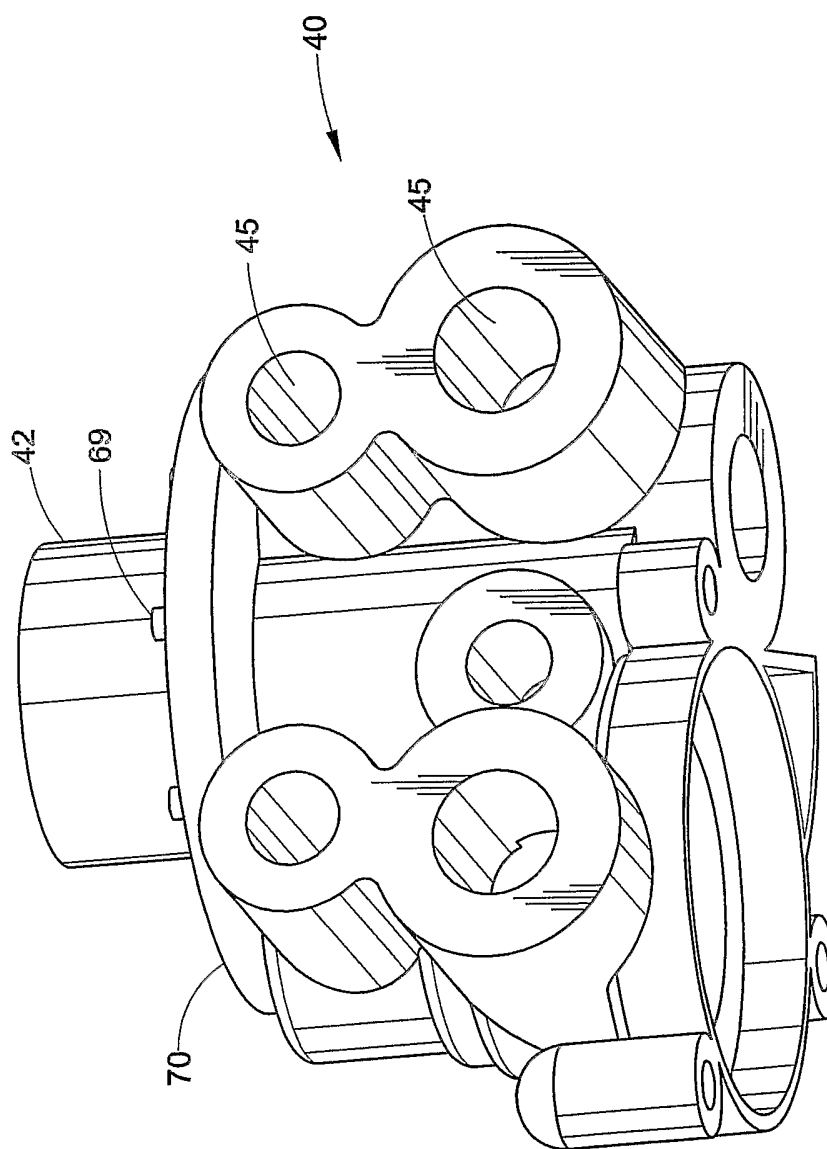


FIG. 4

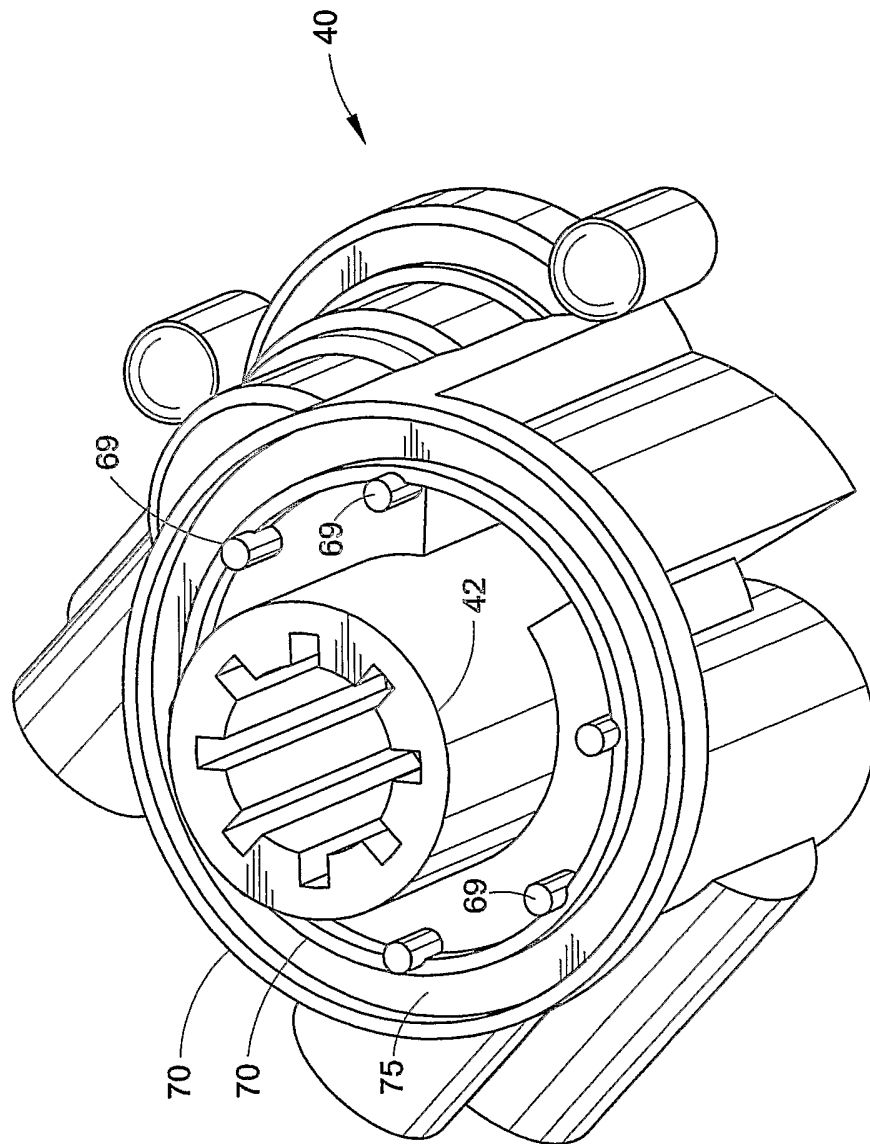


FIG. 5

INTERNATIONAL SEARCH REPORT

National Application No
PCT/US2004/002268

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B60T17/00 B01D53/26 F16M11/06

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)
 IPC 7 B60T F16M B01D

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
 EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 5 622 544 A (SHAMINE DENNIS R ET AL) 22 April 1997 (1997-04-22) abstract; figure 2 ---	23 1-22, 24-26
X A	US 5 427 609 A (ZOGLMAN NORBERT P ET AL) 27 June 1995 (1995-06-27) abstract; figure 2 ---	23 1-22, 24-26
A	US 5 522 150 A (SCHULTZ PAUL A) 4 June 1996 (1996-06-04) abstract; figure 2 -----	1-26

Further documents are listed in the continuation of box C.
 Patent family members are listed in annex.

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Date of the actual completion of the international search 27 May 2004	Date of mailing of the international search report 08/06/2004
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Schroeder, R
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/002268

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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