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GB 1052680
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US 3592164A
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(71) Applicants
Fichtel & Sachs AG, 62 Ernst-Sachs-Strasse, Schweinfurt, Germany, Fed. Rep. of Germany
(72) Inventors
Günther Handke, Johachim Kopic
(74) Agents
Matthews, Haddan & Co.

(54) Piston rod guide in dual tube shock absorbers

(57) A hydro-pneumatic damping unit comprises a cylinder member 10 which is disposed within a cylindrical container 22 and provided with a piston rod guiding and sealing unit 14 including a guiding member 40 having an axially directed guiding bore 44, which is radially centered with respect to said cylinder member 10. At least an axial inner section of said guiding member 40 is housed inside said cylindrical container 22 and bridging means 26 are provided for axially closing the annular cavity 24 between cylinder and container and radially centering said guiding member 40 with respect to said container 22.

The outer diameter of said guiding member 40 is substantially smaller than the inner diameter of said container 22.

The bridging means 26 may comprise an annular centering member 52, 58 separate from both said container 22 and said guiding member 40, or it may be constituted by part of the end cap.

The presence of the bridging means overcomes the need to manufacture different sizes of piston rod guides to fit exactly different sized containers.

FIG.1

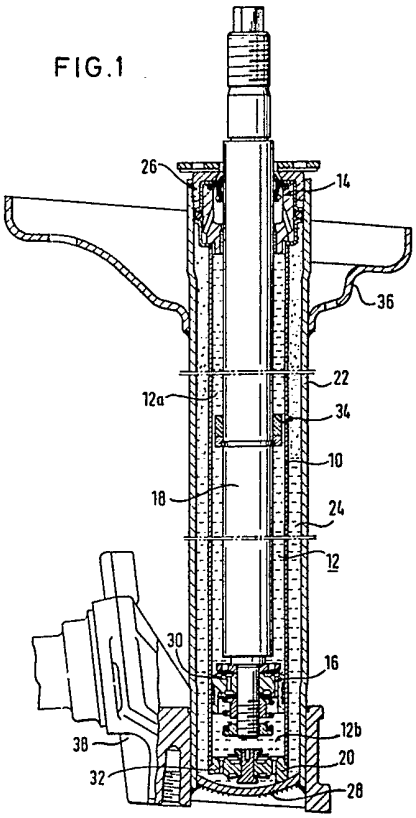

FIG.2

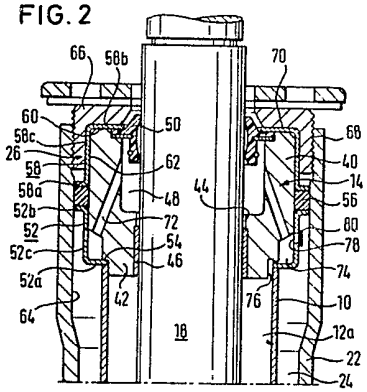

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FIG.1

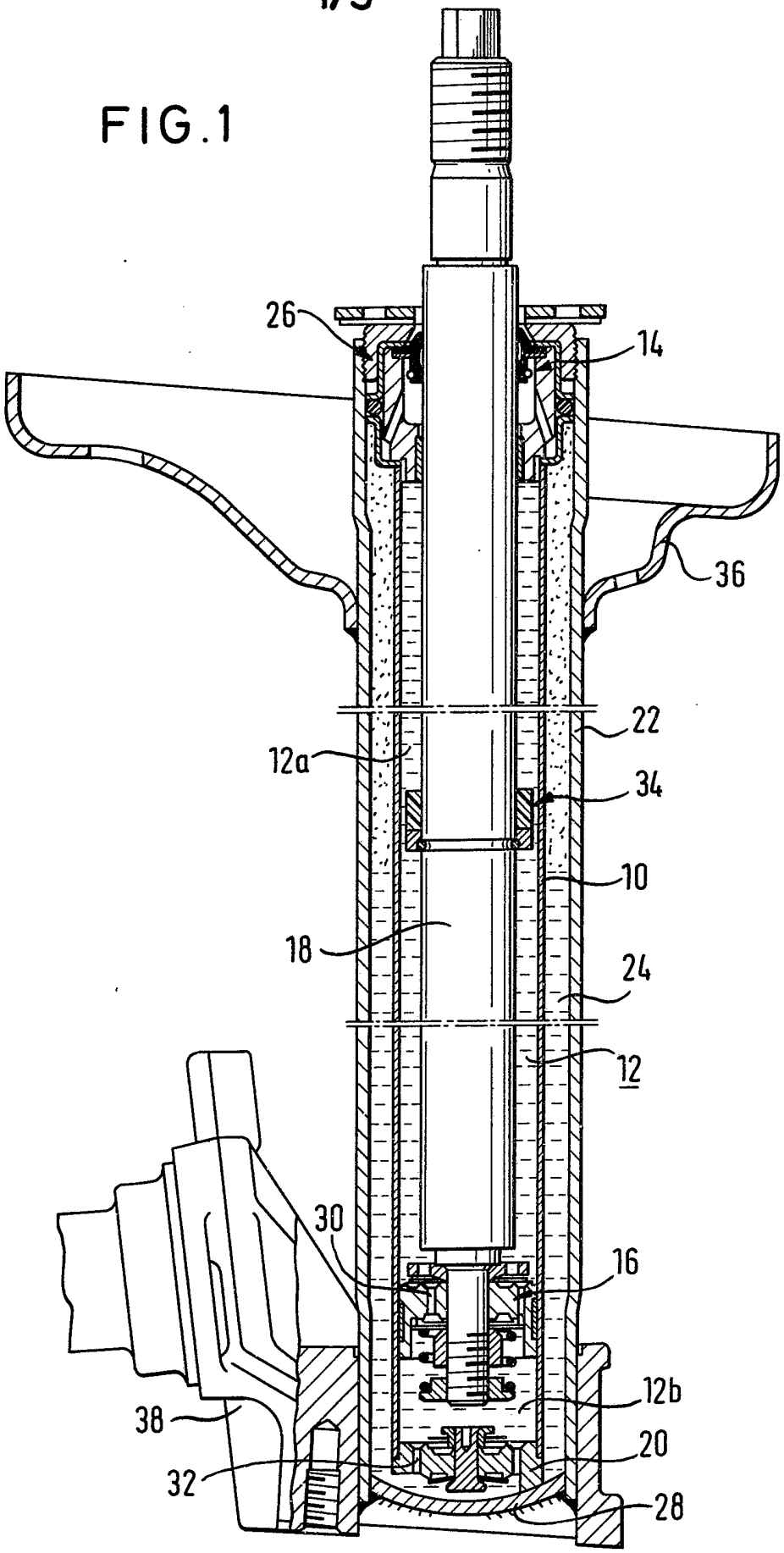

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FIG. 2

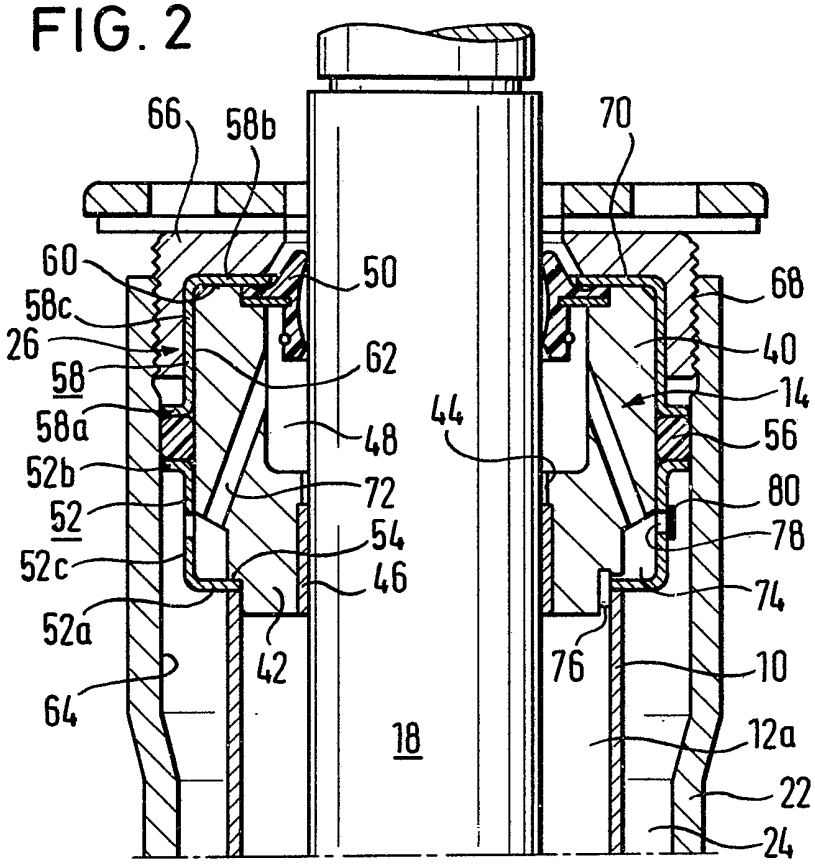

FIG. 3

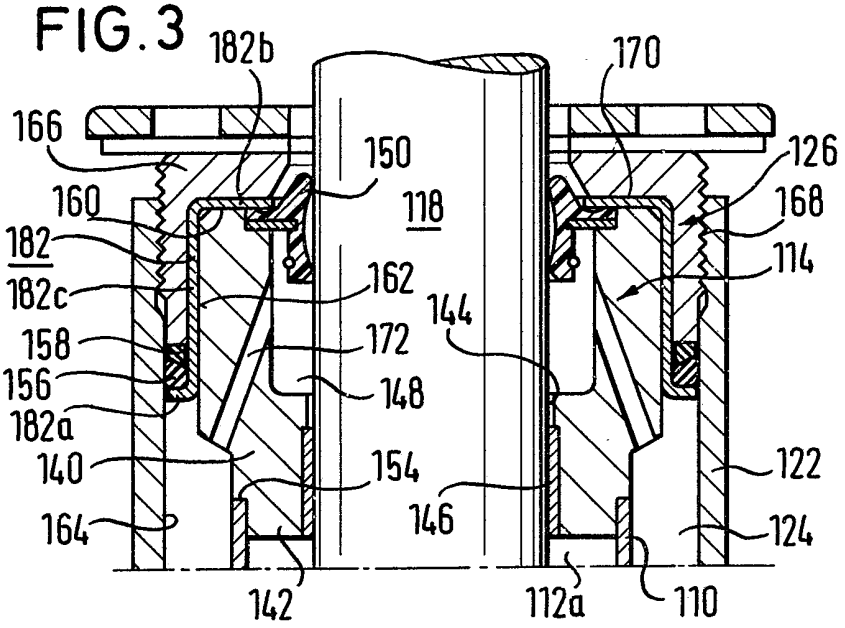

FIG. 4

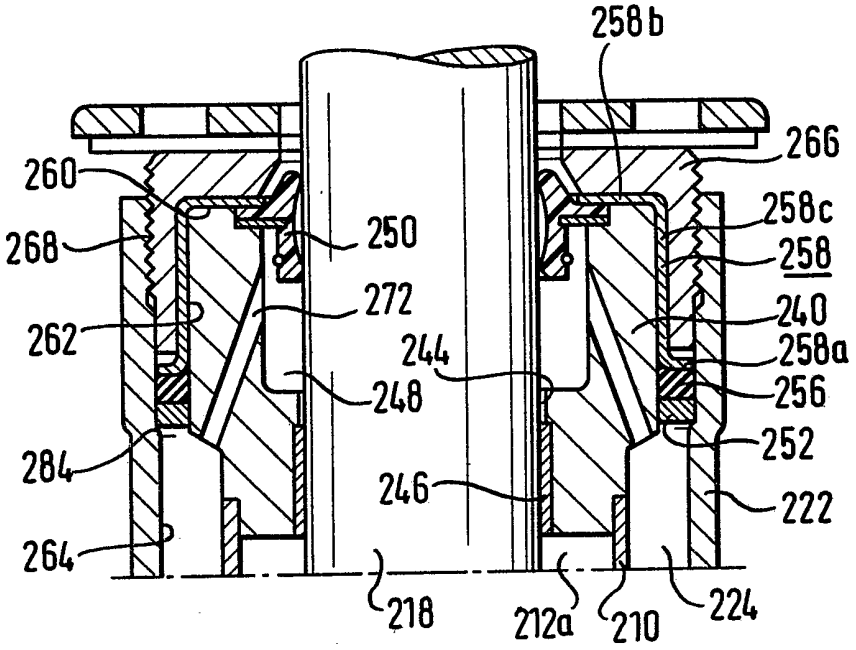
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FIG. 5

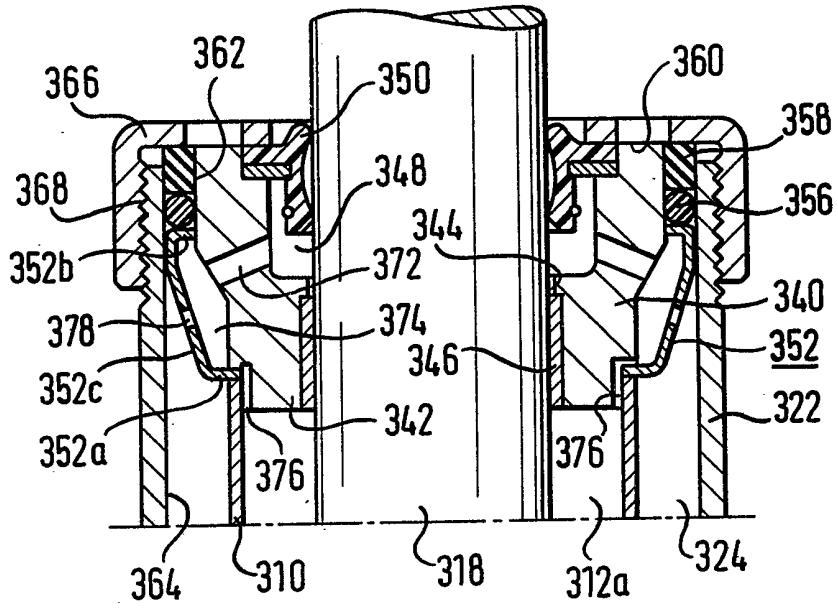
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FIG. 6

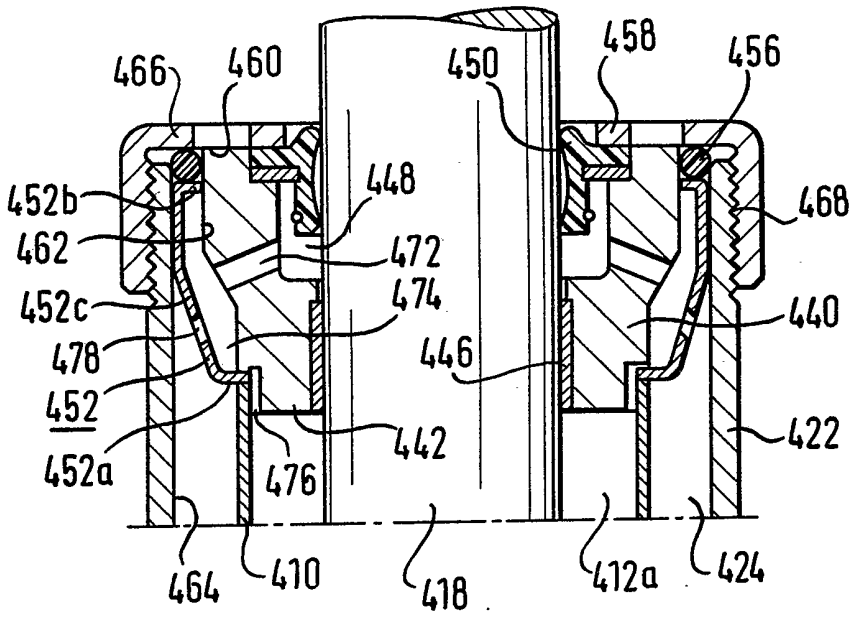
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FIG. 7

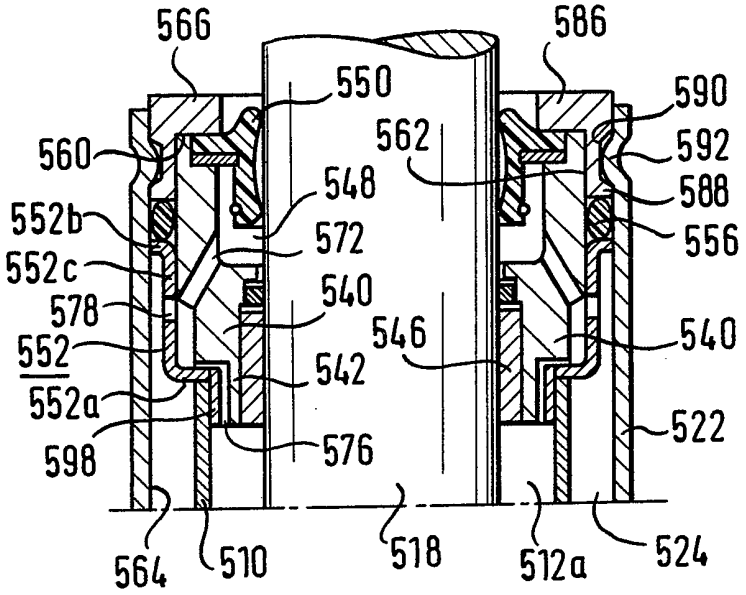
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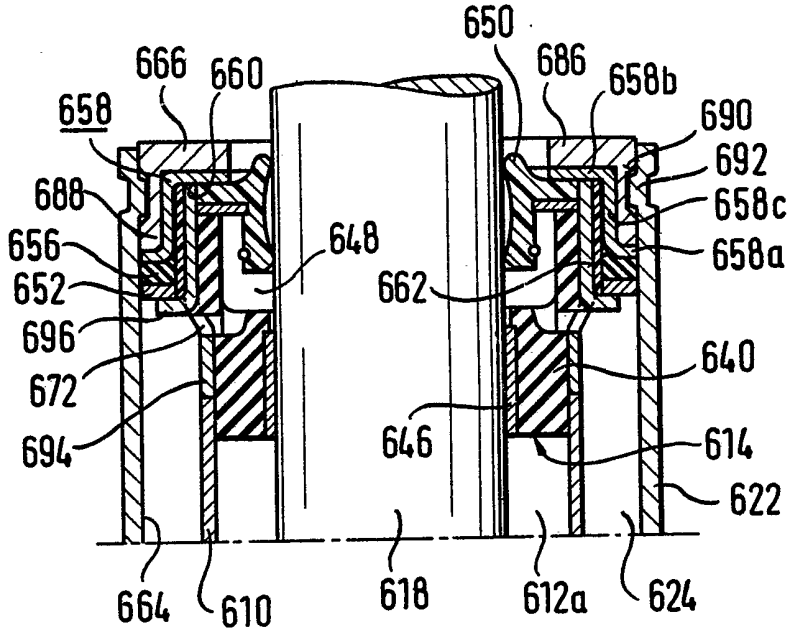
FIG. 8



SPECIFICATION

A hydro-pneumatic damping device

The present invention relates generally to a hydro-pneumatic damping unit to be used as a shock absorber or as a part of a telescopic strut mechanism.

Units of the type to which the present invention relates usually comprise

1) a cylinder member having an axis and two ends, a central cavity being defined within said cylinder member between said two ends, a first of said ends being provided with an axially directed piston rod guiding and sealing unit, said piston rod guiding and sealing unit including a guiding member having an axially directed guiding bore, which is radially centered with respect to said cylinder member;

2) a piston rod extending inward and outward of said cavity through said guiding bore;

3) a piston unit attached to the inner section of said piston rod, said piston unit dividing said central cavity into two cylinder chambers, a first cylinder chamber adjacent said first end of said cylinder member and a second cylinder chamber adjacent the second end of said cylinder member, said two cylinder chambers being connected across said piston unit by throttled first fluid passage means;

4) a body of liquid contained in said two cylinder chambers;

5) a cylindrical container surrounding said cylinder member, said container having a first end adjacent said first end of said cylinder member and a closed, second end adjacent the second end of said cylinder member, an annular cavity being defined between said cylinder member and said cylindrical container, said annular cavity being connected to said second cylinder chamber by throttled, second fluid passage means adjacent the second end of said cylinder member, said annular cavity being partially filled with a liquid and partially filled with a gas, at least an axial inner section of said guiding member being housed inside said cylindrical container adjacent the first end thereof;

6) annular cavity bridging means being provided adjacent the first end of said container for axially closing said annular cavity and radially centering said guiding member with respect to said container.

In known units of this type the guiding member is in contact with the radially inner circumferential face of the container. It is therefore necessary, that the outer diameter of the guiding member precisely corresponds to the inner diameter of the container. As the inner diameter of the container frequently varies in accordance with the requirements of the specific construction, in which the damping unit is to be used, it is necessary, that also the guiding members must be manufactured in different sizes adapted to the different containers. this increases the costs involved in manufacturing the damping units especially in cases, in which the guiding members are made from sintered material.

It is the task of the present invention to provide a hydro-pneumatic damping unit, which eliminates many of the disadvantages of prior art structures and especially insures the use of different sizes of containers in combination with a standard size of guiding members.

Briefly, in accordance with the present invention, the hydro-pneumatic damping unit comprises a cylinder member, a central cavity being defined within said cylinder member, a guiding and sealing unit at a first end of said cylinder member, said guiding and sealing unit comprising a guiding member, a piston unit provided within said central cavity, a piston rod connected to said piston unit and extending through a bore of said guiding member, a cylindrical container surrounding said cylinder member and having a first end adjacent the first end of said cylinder member and defining an annular cavity around said cylinder member, said annular cavity being connected by fluid passage means to said central cavity and annular cavity bridging means being provided adjacent the first end of said container for axially closing said annular cavity and radially centering said guiding member with respect to said container.

In accordance with one feature of the invention the outer diameter of said guiding member is smaller, than the inner diameter of said container and said bridging means comprise an annular centering member separate from both said container and said guiding member for radially centering said guiding member with respect to said container.

In accordance with a further feature of this invention an annular cavity sealing member is housed in radial direction between a radially outer circumferential face of said guiding member and a radially inner circumferential face of said container and in axial direction between first and second supporting members, said first and said second annular supporting members providing substantially axially directed sealing member engagement faces.

In accordance with another feature of the invention said annular centering member is established by at least one of said annular supporting members.

Further features of this invention relate to the construction and the position of said annular supporting members with respect to said guiding member and to additional functions of said annular supporting members.

The various features of novelty, which characterise the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

In the drawings

Fig. 1 is a sectional view showing a telescopic strut mechanism showing a first embodiment of this invention,

Fig. 2 is an enlarged sectional view of the guiding and sealing unit and the annular cavity bridging means,

Fig. 3 is a second embodiment of the guiding and sealing unit and the annular cavity bridging means,

Fig. 4 is a third embodiment of the guiding and sealing unit and the annular cavity bridging means,

Fig. 5 is a fourth embodiment of the guiding and sealing unit and the annular cavity bridging means,

Fig. 6 is a fifth embodiment of the guiding and sealing unit and the annular bridging means,

Fig. 7 is a sixth embodiment of the guiding and sealing unit and the annular cavity bridging means and

Fig. 8 is a seventh embodiment of the guiding and sealing unit and the annular cavity bridging means.

In Fig. 1, 10 designates a cylinder member. Within this cylinder member 10 there is defined a central cavity 12. The cylinder member 10 is closed at its first end by a guiding and sealing unit generally designated by 14. A piston unit 16 is provided inside the cavity 12. This piston unit 16 is fixed to the inner end of a piston rod 18 extending inward and outward the central cavity 12 and passing through the guiding and sealing unit 14. At the second end of the cylinder member 10, which is the lower end, as shown in fig. 1, there is provided a bottom valve unit 20. The cylinder member 10 is surrounded by a cylindrical container 22. The container 22 and the cylinder member define an annular cavity 24. This annular cavity 24 is closed at a first end of the container 22, which is the upper end as shown in fig. 1, by annular cavity bridging means, which are designated by 26. This annular cavity bridging means have the additional function of centering the guiding and sealing unit 14 with respect to the container 22. The second or lower end of the container 22 is closed by a substantially spherical bottom wall 28. This bottom wall 28 serves as an abutment for the bottom valve unit 20, the bottom valve unit 20 being axially pressed against bottom wall 28 by the annular cavity bridging means 26, the axial force being transmitted by the guiding and damping unit 14 and the cylinder member 10.

The piston unit 16 defines a first cylinder chamber 12a and a second cylinder chamber 12b within the cavity 12. The cylinder chambers 12a and 12b are filled with a liquid, for example an hydraulic oil. The annular cavity 24 is partially filled with a liquid and partially with a gas. The gas may be air. The air may be under pressure. The pressure of the air may be a low pressure, which is substantially equal to atmospheric pressure, when the piston rod 18 is in its uppermost position as shown in fig. 1, so that only a rise in pressure occurs, when the piston rod 18 is moved into its downward position as shown in fig. 1. It is possible however to provide a considerable air pressure within annular cavity 24 independently of the position of the piston of the piston rod 18, so that the unit acts as a gas spring in addition to its damping function.

Across the piston unit 16 there extend throttled first fluid passage means 30, which provide a fluid connection between the first and the second cylinder chambers 12a and 12b respectively. Second throttled fluid passage means 32 are provided by the bottom valve unit 20, which provide a fluid connection between the second cylinder chamber 12b and the annular cavity 24. An abutment unit 34 is provided on the piston rod 18, which abutment unit abuts against the guiding and sealing unit 14, when the piston rod 18 approaches its uppermost position as shown in fig. 1, so as to limit the outward movement of the piston rod 18.

The container 22 is provided with a supporting dish 36 for engaging a helical compression spring associated to the telescopic strut mechanism as know per se. Further the lower or second end of the container 22 is mechanically fixed to an axle spindle unit 38, on which a steered wheel of a motor vehicle may be rotatably mounted, in which case the container 22 is rotatable about the axis of the piston rod 18.

The guiding and sealing unit 14 and the bridging means 26 are shown in more detail in fig. 2.

According to fig. 2 the guiding and sealing unit 14 comprises a guiding member 40, which guiding member has an axial extension 42 engaging the inner circumferential face of the cylinder member 10. Further the guiding member 14 is provided with an axial bore 44. The piston rod 18 passes through said bore 44. The bore 44 is lined with a lining sleeve 46 made, for example, of a plastics material. An annular sealing chamber 48 is provided within the guiding member 40.

This sealing chamber 48 is closed at its upper end by a piston rod sealing member 50 sealingly engaging both the piston rod 18 and the guiding member 40.

The guiding member 40 has an outer diameter which is smaller, than the inner diameter of the container 22. A second annular supporting member 52 is provided between the guiding member 40 and the container 22. This second annular supporting member 52 comprises a first flange 52a, which is positioned between the upper end of the cylinder member 10 and a shoulder face 54 of the guiding member 40. Further the first annular supporting member 52 comprises a second flange 52b and an intermediate section 52c. An annular cavity sealing member 56 is provided adajcent the second flange 52b. A first annular supporting member 58 is provided on the upper side of the annular cavity sealing member 56. This first annular supporting member 58 comprises a first flange 58a adjacent the annular cavity sealing member 56, a second flange 58b adjacent an outer axial end face 60 of the guiding

member 40 and an intermediate section 58c adjacent the outer circumferential face 62 of the guiding member 40. At least one of the flanges 52b and 58a acts as an annular centering member centering the guiding member 40 with respect to the inner circumferential face 64 of the container 22. The first annular supporting member 58 is axially positioned by a cap-shaped holding member 66, which is in engagement with the outer circumferential face of the container 22 by thread means 68. The holding member 66 comprises a holding face 70, which holds the flange 58b in engagement with the axial end face 60. By this holding member 66 the guiding member 40 and the cylinder member 10 are urged in downward direction as seen in fig. 1 and 2, so that the bottom valve unit 20 is pressed against the bottom wall 28 and centered with respect to the container 22. The annular cavity sealing member 56 is axially compressed between the flanges 52b and 58a, so as to be urged in sealing engagement with the outer circumferential face 62 of of the guiding member 40 and with the inner circumferential face 64 of the container 22. The piston rod sealing member 50 is axially fixed by the flange 58b.

The annular sealing chamber 48 is connected by a bore 72 with an annular fluid collecting chamber 74, which is defined by the guiding member 40 and the second supporting member 52. The fluid collecting chamber 74 is connected to the upper cylinder chamber 12a by first bleed means 76. Further the fluid collecting chamber 74 is connected by second bleed means 78 to the annular cavity 24.

In operation, when the piston rod 18 moves upward as seen in fig. 1 and 2, air bubbles contained in the cylinder chamber 12a can escape through the first bleed means 76 into the fluid collecting chamber 74 and across the plastic liner 46 into the annular sealing chamber 48. This air can return through second bleed means 78 into the annular cavity 24. Liquid is collected in the fluid collecting chamber 74 below the second bleed means 78, so that during downward movement of the piston rod, when partial vacuum may occur in cylinder chamber 12a, liquid (and substantially no gas) returns from the fluid collecting chamber 74 into the cylinder chamber 12a. A check valve established by an elastic sleeve 80 as shown in the right hand side of fig. 2 may be associated to the second bleed means 78, so that fluid can flow only from the fluid collecting chamber 74 to the annular cavity 24, but not in the other direction.

In the embodiment of fig. 3 analogous parts are designated by the same reference numbers as in the embodiments of fig. 1 and 2 increased by 100.

In the embodiment of fig. 3 the second annular supporting member is designated by 182. This second annular supporting member 182 comprises a first flange 182a adjacent the annular cavity sealing member 156 and a second flange 182b adjacent the outer axial end face 160 of the guiding member 140 and an intermediate section 182c. The intermediate section 182c is adjacent the outer circumferential face 162 of the guiding member 140. In this embodiment the annular cavity sealing member 156 and the second annular supporting member 158 are housed between the inner circumferential face 164 of the container 122 and the intermediate section 182c of the second annular supporting member 182, the holding member 156 pressing the flange 182b against the axial end face 160 of the guiding member 140 and urging the first annular supporting member 158 against the annular cavity sealing member 156. It is important in this construction, that the flange 182b is in sealing engagement with the piston rod sealing member 150.

In the embodiment of fig. 4 analogous parts are designated with the same reference numbers as in the embodiment of fig. 2, increased by 200.

The embodiment of fig. 4 is different from the embodiment of fig. 2 by a different shape of the second annular supporting member 252. The annular supporting member 252 is axially positioned by a shoulder 284 provided at the inner circumferential face 264 of the container 222. It is to be noted, that either the first annular supporting member 258 with its flange 258a or the second annular supporting member 252 functions as an annular centering member. The holding member 266 urges the flange 258b against the axial end face 260 of the guiding member 240 and simultaneously urges flange 258a against the annular cavity sealing member 256, so that this annular cavity sealing member is in sealing engagement with both the inner circumferential face 264 of the container 222 and the outer circumferential face 262 of the guiding member 240. The holding member 266 is cap-shaped as in fig. 2 and in threaded engagement with the inner circumferential face of the container 222. The intermediate section 258 is in engagement with the outer circumferential face 262 of the guiding member 240.

In the embodiment of fig. 5 analogous parts are designated with the same reference numbers as in fig. 2 increased by 300.

The embodiment of fig. 5 differs from the embodiment of fig. 2 by another shape of the second annular supporting member 352, which shows two axially inward directed flanges 352a and 352b. The first annular supporting member 358 is a plastic ring of rectangular cross section. The annular cavity sealing member 356 is compressed between flange 352b and the first annular supporting member 358, so as to engage the inner circumferential face 364 of the container 322 and the outer circumferential face 362 of the guiding member 340. The holding member 366 is cap-shaped and engages the outer circumferential face of the container 322 by thread means 368. The holding member 366 engages the axial end face 360 of the guiding member 340 and urges the first annular supporting member 358 against the annular cavity sealing member 356. The centering function is fulfilled either by the first

annular supporting member 358 or by the second annular supporting member 352.

The embodiment of fig. 6 is very similar to the embodiment of fig. 5, analogous parts are designated by the same reference numbers as in fig. 2 increased by 400.

In the embodiment of fig. 6 — in so far as a difference with respect to fig. 5 — a flange 458 of the holding member 466 fulfills the function of the first annular supporting member. The centering function is fulfilled in this embodiment by the second annular supporting member 452.

In the embodiment of fig. 7 analogous parts are designated by the same reference numbers as in fig. 2 increased by 500.

In the embodiment of fig. 7 there is shown a complete double tube damping unit, in which the container 522 is made of a plastic tube. This unit is to be inserted as a whole into the tube of a telescopic strut mechanism for example the container 22 as shown in fig. 2. The holding member 556 comprises a radially inwardly directed flange 586 and an axial section 588. In the axial section 588 there is provided on the outer circumferential face thereof an annular groove 590. A radially inward directed depression 592 of the container 522 engages the annular groove 590. The radial flange 586 is in contact with the axial end face 560 of the guiding member 540. The axial section 588 of the holding member 586 acts as the first annular supporting member urging the annular cavity sealing member 556 against the flange 552b, so that the annular cavity sealing member 556, which is preferably of elastomeric material like rubber, is in sealing engagement with the circumferential face 564 of the container 522 and with the outer circumferential face 562 of the guiding member 540. The engagement of the depression 592 and the annular groove 590 may allow an axial play between the holding member 566 and the container 522. Moreover the container 522 may be axially compressible, so that an axial force may be transmitted through the flange 586, the guiding member 540 and the cylinder member 510 to the bottom wall 28 as shown in fig. 1 without substantial axial forces arising in the axial section of the container 522. When the unit of fig. 7 is mounted in a tube like the tube 22 of fig. 1, a further holding member may be provided for urging the holding member 566 in axial engagement with the axial end face 560 of the guiding member 540.

The centering function in this embodiment may be fulfilled by the axial section 588 of the holding member 566 or preferably by the second annular supporting member 552.

The embodiment of fig. 8 is similar to the embodiment of fig. 7 as far as the design of the holding member is concerned. Analogous parts are designated by the same reference numbers as in fig. 2 increased by 600. The first annular supporting member 658 is similar to the embodiment of fig. 2.

The guiding member 640 is in this embodiment made of plastic material, whereas in the embodiments as discussed before the guiding member is of metallic or sintered material. The guiding member 640 is reinforced by a reinforcing sleeve 694. This reinforcing sleeve 694 abuts the upper or first end of the cylinder member 610. In the middle part of the reinforcing sleeve 694 lugs 696 are punched from the reinforcing sleeve and bend in radial outward direction. These lugs 696 provide a seat for the second annular supporting member 652. The annular cavity sealing member 656 is axially compressed between the flange 658a of the first annular supporting member 658 and the second annular supporting member 652, so as to sealingly engage the inner circumferential face 664 of the container 622 and the outer circumferential face 662 of the guiding member 614. The container 622 can be again of compressible plastic material and a lost motion may be possible between the depression 692 and the annular groove 690. The radial flange 686 of the holding member 666 urges the flange 658b against the axial end face 660 of the guiding member 640.

With respect to fig. 7 it is still to be noted, that an annular adapter member 598 is provided on the axial extension 542 of the guiding member 540 for adapting the guiding member 540 to cylinder members 510 of varying inner diameter.

It is to be noted, that in all embodiments the first or upper end of the cylinder member may be pressure fitted on to the axial extension of the guiding member.

In the embodiments of fig. 7 and 8 the depressions 592 and 692 respectively may be preshaped in the container before mounting the unit, so that the depressions 592 and 692 engage the annular groove 590 and 690 respectively by a snap action after a preliminary circumferential elongation of the container.

In fig. 8 it is to be noted, that passages 672 between the annular sealing chamber 648 and the annular cavity 624 are provided by the formation of the lugs 696.

The embodiment of the double tube shock absorbers of fig. 7 and 8 may be used in the telescopic strut mechanism of fig. 1, when after a period of use the damping action is reduced. It is however possible also to provide a double tube shock absorber according to fig. 7 and 8 in a container 22 of fig. 1 already when the telescopic strut mechanism is marketed for the first time.

As far as the embodiment of fig. 8 is concerned, it should be noted, that the guiding member 640 may be moulded according to conventional moulding methods, the reinforcement sleeve 694 being embedded during the moulding step.

It is possible in all embodiments of this invention to prefabricate units comprising the cylinder member, the bottom valve unit and at least part of the sealing and guiding unit and to insert such prefabricated units at a later date into the container.

It is a specific advantage of this invention, that the guiding members can be used in containers of

varying inner diameter without the necessity of milling the guide members for adapting them to the inner diameter of the container. The annular centering members and/or the annular supporting members are cheap in manufacturing and can be manufactured and stored in all possible combinations of containers and guiding members.

CLAIMS

1. In a hydro-pneumatic damping unit comprising:

1) a cylinder member having an axis and two ends, a central cavity being defined within said cylinder member between said two ends, a first of said ends being provided with an axially directed piston rod guiding and sealing unit, said piston rod guiding and sealing unit including a guiding member having an axially directed guiding bore, which is radially centered with respect to said cylinder member;

2) a piston rod extending inward and outward of said cavity through said guiding bore;

3) a piston unit attached to the inner section of said piston rod, said piston unit dividing said central cavity into two cylinder chambers a first cylinder chamber adjacent said first end of said cylinder member and a second cylinder chamber adjacent the second end of said cylinder member said two cylinder chambers being connected across said piston unit by throttled first fluid passage means;

4) a body of liquid contained in said two cylinder chambers;

5) a cylindrical container surrounding said cylinder member, said container having a first end adjacent said first end of said cylinder member and a closed, second end adjacent the second end of said cylinder member, an annular cavity being defined between said cylinder member and said cylindrical container, said annular cavity being connected to said second cylinder chamber by throttled, second fluid passage means adjacent the second end of said cylinder member, said annular cavity being partially filled with a liquid and partially filled with a gas, at least an axial inner section of said guiding member being housed inside said cylindrical container adjacent the first end thereof;

6) annular cavity bridging means being provided adjacent the first end of said container for axially closing said annular cavity and radially centering said guiding member with respect to said container the improvement which comprises, that

a) the outer diameter of said guiding member at least along said axial inner section thereof, which is housed inside said container is smaller than the inner diameter of said container along said axial inner section;

b) said briding means comprise

b1) an annular centering member separate from both said container and said guiding member (40) for radially centering said guiding member with respect to said container and

b2) an annular cavity sealing member.

2. A hydro-pneumatic damping unit as set forth in claim 1, wherein said annular cavity sealing member is housed in radial direction between a radially outer circumferential face of said guiding member and a radially inner circumferential face of said container and in axial direction between first and second annular supporting members said first and second annular supporting members providing substantially axially directed sealing member engagement faces, the sealing member engagement face of said first annular supporting member being directed toward said second end of said cylinder member and the sealing member engagement face of said second annular supporting member being directed away from said second end of said cylinder member.

3. A hydro-pneumatic damping unit as set forth in claim 2, wherein said guiding member is in engagement with said first end of said cylinder member and said second annular supporting member is axially fixed with respect to said guiding member in at least one axial direction at the place of engagement between said guiding member and said first end of said cylinder member.

4. A hydro-pneumatic damping unit as set forth in claim 3, wherein said guiding member comprises an axially inner extension engaging the inner circumferential face of said cylinder member and a shoulder face axially directed towards the second end of said cylinder member said second annular supporting member being fixed in axial direction by engagement with both said shoulder face and said first end of said cylinder member.

5. A hydro-pneumatic damping unit as set forth in claim 4, wherein said second supporting member comprises:

a) a first flange axially positioned between said shoulder face and said first end of said cylinder member

b) a second flange adjacent said annular cavity sealing member and

c) a substantially axially directed intermediate section interconnecting said two flanges

6. A hydro-pneumatic damping unit as set forth in claim 5, wherein said second annular supporting member is substantially Z-shaped in cross section, said first flange being directed radially inward with respect to said axis, said second flange being directed radially outward with respect to said axis, said intermediate section being adjacent said radially outer circumferential face of said guiding member

7. A hydro-pneumatic damping unit as set forth in claim 5, wherein said second annular supporting member is substantially C-shaped, both said first flange and said second flange being directed radially inward with respect to said axis, said intermediate section being adjacent over at least part of its axial length to said radially inner circumferential face of said container.

8. A hydro-pneumatic damping unit as set forth in claim 2, wherein an annular fluid collecting chamber is defined by said guiding member and one of said annular supporting members said annular fluid collecting chamber being connected

by first bleed means to said first cylinder chamber and by second bleed means to said annular cavity.

9. A hydro-pneumatic damping unit as set forth in claim 8, wherein said annular liquid collecting chamber is defined by said guiding member and said second annular supporting member.

10. A hydro-pneumatic damping unit as set forth in claim 8, wherein said first bleed means are situated adjacent that axial end of said annular fluid collecting chamber, which is situated toward the second end of said cylinder member and said second bleed means are positioned in an axial distance from said first bleed means toward the other axial end of said annular fluid collecting chamber.

11. A hydro-pneumatic damping unit as set forth in claim 2, wherein said annular cavity sealing member is in sealing contact with both the radially outer circumferential face of said guiding member and the radial inner circumferential face of said container.

12. A hydro-pneumatic damping unit as set forth in claim 2, wherein said second annular supporting member is axially fixed in at least one axial direction by radially inward directed projection means at the radial inner circumferential face of said container.

13. A hydro-pneumatic damping unit as set forth in claim 12, wherein said radially inward directed projection means are defined by an annular shoulder of said container.

14. A hydro-pneumatic damping unit as set forth in claim 2, wherein said second annular supporting member is axially fixed in at least one axial direction by projection means of said guiding member directed in radially outward direction with respect to said axis.

15. A hydro-pneumatic damping unit as set forth in claim 14, wherein said guiding member is a plastic member reinforced by a substantially axially directed metallic reinforcing sleeve, said radially outward directed projection means being defined by lugs extending radially outward from said reinforcing sleeve.

16. A hydro-pneumatic damping unit as set forth claim 2, wherein said bridging means comprise a holding member engaging said container member and holding said cylinder member through said guiding member in axial contact with said second end of said container.

17. A hydro-pneumatic damping unit as set forth in claim 16, wherein said first annular supporting member is axially fixed with respect to said guiding member by said holding member in at least one axial direction.

18. A hydro-pneumatic damping unit as set forth in claim 17, wherein said first annular supporting member is axially fixed at the outer axial end of said guiding member, which is remote from said second end of said cylinder member.

19. A hydro-pneumatic damping unit as set forth in claim 18, wherein said first annular supporting member is Z-shaped in cross section and comprises:

a) a first flange directed in radially outward direction with respect to said axis adjacent said annular cavity sealing member

b) a second flange directed in radial inward direction with respect to said axis, which second flange is adjacent said outer axial end of said guiding member

c) an intermediate axial section extending between said first and second flanges, said intermediate section being adjacent the radially outer circumferential face of said guiding member, and wherein said holding member comprises an axially directed holding face directed toward said second end of said cylinder member and acting onto the second flange of said Z-shaped supporting member.

20. A hydro-pneumatic damping unit as set forth in claim 19, wherein an annular sealing chamber is defined within an annular guiding member around said piston rod, which sealing chamber is axially closed at its end remote from said second end of said cylinder member by an annular piston rod sealing member, said piston rod sealing member sealingly engaging said guiding member and said piston rod, said piston rod sealing member being axially fixed by said second flange.

21. A hydropneumatic damping unit as set forth in claim 17, wherein said first annular supporting member is established by a part of said holding member integral therewith.

22. A hydro-pneumatic damping unit as set forth in claim 16, wherein said second supporting member is axially fixed by said holding member in at least one axial direction.

23. A hydro-pneumatic damping unit as set forth in claim 22, wherein said second annular supporting member is axially fixed at the outer axial end of said guiding member which is remote from said second end of said cylinder member.

24. A hydro-pneumatic damping unit as set forth in claim 23, wherein said second annular supporting member is substantially Z-shaped in cross section having

a) a first flange directed in radial outward direction with respect to said axis and adjacent said annular sealing member,

b) a second flange adjacent said outer axial end of said guiding member, and

c) an axially directed intermediate section extending between said flanges, said intermediate section being adjacent the outer circumferential face of said guiding member said holding member having a holding face axially directed toward the second end of said cylinder member and acting onto said second flange, said first axial supporting member being positioned in radial direction between said radial inward directed circumferential face of said container and said intermediate section of said Z-shaped second annular supporting member and being fixed by said holding member in an axial direction away from said second end of said cylinder member an annular sealing cavity being defined within said guiding member around said piston rod said annular sealing chamber being closed at its end

remote from said second end of said cylinder member by a piston rod sealing member said piston rod sealing member being held in its axial position by said second radial flange, said piston rod sealing member being in sealing engagement with said piston rod and said second radial flange.

25. A hydro-pneumatic damping unit as set forth in claim 2, wherein said annular centering member is established by at least one of said annular supporting members

26. A hydro-pneumatic damping unit as set forth in claim 1, wherein said container is established by a tube of telescopic strut mechanism receiving the hydro-pneumatic damping unit.

27. A hydro-pneumatic damping unit as set forth in claim 2, wherein said annular cavity sealing member is axially compressed between said first and second supporting members.

28. A hydro-pneumatic damping unit as set forth in claim 4, wherein an annular adapter member is positioned on said axially inner extension and engages the inner face of said cylinder member.

29. In a hydro-pneumatic damping unit comprising: a cylinder member, a central cavity being defined within said cylinder member, a guiding and sealing unit at a first end of said cylinder member, said guiding and sealing unit comprising a guiding member, a piston unit provided within said central cavity, a piston rod connected to said piston unit and extending through a bore of said guiding member, a cylindrical container surrounding said cylinder member and having a first end adjacent the first end of said cylinder member and defining an annular cavity around said cylinder member, said annular cavity being connected by fluid passage means to said central cavity and annular cavity bridging means being provided adjacent the first end of said container for axially closing said annular cavity and radially centering said guiding member with respect to said container, the improvement which comprises, that

a) the outer diameter of said guiding member at least along an axial inner section thereof, which is housed inside said container, is smaller than the inner diameter of said container along said axial inner section and

b) said bridging means comprise an annular centering member separate from both said container and said guiding member for radially centering said guiding member with respect to said container.

30. A hydro-pneumatic damping unit substantially as described with reference to the accompanying drawing.

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