

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 802 273 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

05.06.2002 Bulletin 2002/23

(51) Int Cl.7: **D06F 58/06**

(21) Application number: **97103521.7**

(22) Date of filing: **04.03.1997**

(54) **Washing dryer**

Wäschetrockner

Sèche linge

(84) Designated Contracting States:
DE FR GB IT SE

(30) Priority: **20.04.1996 DE 19615822**

(43) Date of publication of application:
22.10.1997 Bulletin 1997/43

(73) Proprietor: **WHIRLPOOL CORPORATION**
Benton Harbor Michigan 49022 (US)

(72) Inventors:

- **Frank, Michael, c/o Whirlpool Europe s.r.l.**
21025 Comerio (VA) (IT)
- **Sperling, Horst, c/o Whirlpool Europe s.r.l.**
21025 Comerio (VA) (IT)

- **Bollmann, Andreas, c/o Whirlpool Europe s.r.l.**
21025 Comerio (VA) (IT)
- **Bernes, Dietrich, c/o Whirlpool Europe s.r.l.**
21025 Comerio (VA) (IT)
- **Cass, Keith, c/o Whirlpool Europe s.r.l.**
21025 Comerio (VA) (IT)

(74) Representative: **Guerci, Alessandro**
Whirlpool Europe S.r.l.
Patent Department
Viale G. Borghi 27
21025 Comerio (VA) (IT)

(56) References cited:

CH-A- 429 644	US-A- 2 769 246
US-A- 2 823 962	US-A- 3 947 076
US-A- 4 754 556	

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 802 273 B1

Description

[0001] The invention relates to a washing dryer with a drum which is rotatably mounted and which may be rotated, which is additionally guided in the vicinity of the intake side by means of rollers which are supported on the drum shell and which are rotatably mounted by means of bearing axes in a casing portion surrounding the intake opening.

[0002] A washing treatment machine of this type is known from CH-PS 429 644 and US-A-4 754 556. In this known washing treatment machines the bearing and lubrication of the roller presents considerable difficulty. On the one hand the bearing axis, in the form of a rotary part, is extremely expensive to manufacture and requires a considerable outlay on assembly for securing the bearing axis on the casing portion and for securing the roller axially on the bearing axis. In addition there is no possibility of lubricating the bearing for the roller over a long operational period, so that repeated subsequent lubrication is necessary if disturbing running noise is to be avoided.

[0003] The purpose of the invention, in a washing dryer of the type already mentioned, is to improve the bearing for the roller supporting the drum on the intake side in such a way that simple assembly and a type of permanent lubrication of the bearing is achieved with simple parts.

[0004] The object is achieved according to the invention in that the bearing axle is in the form of a hollow axle which is C-shaped in cross-section, and into which there is inserted in the vicinity of the bearing bore of the roller an oil-saturated felt block, in that the felt block projects out of the hollow axle and is resiliently supported on the bearing bore of the roller, in that the roller is positioned axially on the hollow axle by means of two securing members, and in that the securing members are provided with retaining projections, which project through apertures in the hollow axle, into said axle, and axially secure the felt block.

[0005] This design of the bearing axle leads to a part which is simple and cost-effective to manufacture. The roller may be axially positioned on the hollow axle by means of two securing members. The oil-saturated felt block inserted into the hollow axle is at the same time axially secured, so that it retains its position relative to the bearing bore of the roller and permanently lubricates it. The elastic property of the felt block is utilised in such a way that a compensation for tolerance takes place. In addition, the felt block prevents dirt particles from penetrating into the bearing and can also bind said particles. In this way a type of permanent lubrication is achieved. The securing members are arcuate in form and provided on the inner sides facing one another of their legs with engagement projections, which engage resiliently in engagement apertures facing one another of the hollow axle, so that they may be rapidly and simply engaged on the hollow axle. During this engagement procedure,

the retaining projection is introduced into the hollow axle and secures the felt block axially. The securing members abut closely against the outer contour of the hollow axle.

[0006] According to a preferred embodiment, the retaining projections and engagement projections of these securing members, as well as the apertures and the engagement apertures of the hollow axle, have rectangular cross-sections co-ordinated with one another.

[0007] If according to one embodiment the free longitudinal edges of the hollow axle merge into edges aligned towards one another and lying in one plane, then sharp edges entailing a risk of injury during assembly are avoided. In addition, these edges reinforce the hollow axle and also the hollow axle may be non-rotatably secured in a receiving means of a bearing bush adapted to the non-round outer contour.

[0008] According to one embodiment the hollow axle and the securing members extend over an angular range of more than 180°.

[0009] According to one embodiment, in order to secure the hollow axle on the casing portion, the hollow axle is provided on the end facing away from the roller with engagement apertures into which engagement members of a bearing bush, accommodating the hollow axle, of a bearing flange of the casing portion resiliently engage.

[0010] According to one embodiment the securing member, with the retaining projection and the engagement projections, is formed as a one-piece plastics injection moulded part, while the hollow axle with all its members is produced as a hardened stamped and shaped part.

[0011] The invention will be described in more detail with reference to an embodiment given by way of example and shown in the drawings, which illustrate:

Figure 1: a perspective view of a drum of a washing dryer with a casing portion surrounding the intake opening thereof, and upon which there is rotatably mounted a roller,

Figure 2: a perspective detail on a large scale from Figure 1 with the bearing for the roller,

Figure 3: an exploded view of a roller, a felt block, two securing members and a hollow axle, necessary for the bearing,

Figure 4: a perspective view of the roller axially positioned on the hollow axle with felt block, and

Figure 5: a longitudinal section through the roller rotatably mounted and lubricated on the casing portion.

[0012] As Figure 1 shows, there is located on the in-

take side of the drum 10 a casing portion 11, which in a known way is used for articulating the doors and for inserting a lint screen. In addition, it has a portion of the air duct for the process air circuit. The present case involves the rotary bearing or roller 15, which is supported on a running surface 14 on the shell surface of the drum 10. The roller 15 is mounted on a bearing flange 12 of the casing portion 11, which surrounds the intake opening of the drum 10. The bearing of the drum 10 on the opposite end face and the drive means for its rotary movement are not shown in Figure 1, as they are of no importance for the present invention.

[0013] In the enlarged view in Figure 2 it can be seen that the roller 15 carries a rubber tyre 16 and is supported thereby on the running surface 14 of the drum shell. The bearing flange 12 is integrally moulded on the casing portion 11 and has a bearing bush 13, into which the bearing axle of the roller is inserted.

[0014] As Figure 3 shows, the bearing axle for the roller 15 is in the form of a hollow axle 20 with a C-shaped cross-section. On the free longitudinal edges, the hollow axle 20 is provided with rims 21 and 22 aligned towards one another and lying in one plane. For axial positioning of the roller 15, pairs of mutually-opposed engagement apertures 23 and 24 are provided in the hollow axis, and which for example have a rectangular cross-section. Before the hollow axle 20 is introduced into the bearing bore 17 of the roller 15, an oil-saturated felt block 40 is inserted into the hollow axle 20 and can be secured axially in one direction by means of a securing member 30. Thus for example a securing member 30 may be resiliently engaged with engagement projections 31 on the inner sides of its legs into the engagement apertures 23 and 24. The retaining projection 32 of the securing member 30 is introduced into the hollow axle 20 through the aperture 26 and serves as a stop for the felt block 40.

[0015] The hollow axle with the inwardly-rounded rims 21 and 22 has a non-rounded outer contour. If the bearing bush 13 of the bearing flange 12 is adapted with the receiving means to this non-rounded contour of the hollow axle 20, then the introduced hollow axle 20 is non-rotatably secured in the bearing bush 13.

[0016] The end of the hollow axle 20 is thrust into the bearing bore 17 of the roller 15. The end of the hollow axle 20 projecting on the opposite side out of the bearing bore 17 is positioned in the other axial direction with the second securing member 30. Thus the engagement projections 31 engage in the engagement apertures 23 of the hollow axle 20, and the retaining projection 32 of the securing member 30, after passing through an aperture 26 in the hollow axle 20, secures the felt block 40 in the other axial direction. The oil-saturated felt block 40 projects out of the hollow axle 20 and is resiliently supported on the bearing bore 17 of the roller 15, as can be seen from the assembled condition of roller 15 and hollow axle 20 shown in Figure 4.

[0017] On its free end, the hollow axle 20 carries a further pair of engagement apertures 25, into which en-

gagement members 18 of the bearing bush 13 engage, when the hollow axle 20 is introduced with the roller 15 in the correct angular position, as the cross-section in Figure 5 shows. The roller 15 is clearly axially positioned between the two securing members 30 and the retaining projections 32 of the same secure the felt block 40 in such a way that it lies permanently in the bearing bore 17 of the roller 15. The securing members 13 in the central region are reinforced with the retaining projection 32 as an axial stop 33; they are arcuate in shape, so that they abut closely on the periphery of the hollow axle 20. The hollow axle 20 and the securing member 30 extend over an angular range of more than 180°, yet leave a sufficiently wide slot for the introduction of the felt block 40.

[0018] The engagement projections 31 and the retaining projections 32 are rectangular in cross-section, and co-ordinated with the engagement apertures 22 and 23 and the apertures 26 in the hollow axle 20, so that clear resilient engagement and a good hold of the securing members 30 on the hollow axle 20 is achieved.

[0019] The securing member 30, with the engagement projections 31, the retaining projection 32 and the axial stop 33 are produced as a one-piece plastics injection moulded part. The hollow axle 20 is formed from a hardened stamped and shaped part. The oil-saturated felt block 40 provides a type of permanent lubrication for the bearing of the roller 15 on the hollow axle 20. The felt block 40 also keeps dirt particles away from the bearing, and can also bind them.

Claims

1. Washing dryer with a drum which is rotatably mounted and which may be rotated, which is additionally guided in the vicinity of the intake side by means of rollers (15) which are supported on the drum shell (10) and which are rotatably mounted by means of bearing axes in a casing portion (11) surrounding the intake opening,
characterised in that
the bearing axle is in the form of a hollow axle (20) which is C-shaped in cross-section, and into which there is inserted in the vicinity of the bearing bore (17) of the roller (15) an oil-saturated felt block (40),
in that the felt block (40) projects out of the hollow axle (20) and is resiliently supported on the bearing bore (17) of the roller (15),
in that the roller (15) is positioned axially on the hollow axle (20) by means of two securing members (30), and **in that** the securing members (30) are provided with retaining projections (32), which project through apertures (26) in the hollow axle (20), into said axle, and axially secure the felt block (40).
2. Washing dryer according to Claim 1,

characterised in that

the securing members (30) are arcuate in shape and are provided on the inner sides facing one another of their legs with engagement projections (31), which engage resiliently in engagement apertures (23 or 24), mutually opposite one another, of the hollow axle (20).

3. Washing dryer according to Claim 1 or 2,

characterised in that

the retaining projections (32) and the engagement projections (31) of the securing members (30), and the apertures (26) and the engagement apertures (23, 24) of the hollow axle (20) have rectangular cross-sections co-ordinated with one another.

4. Washing dryer according to one of Claim 1 to 3,

characterised in that

the free longitudinal edges of the hollow axle (20) merge into rims (21, 22) aligned towards one another and lying in one plane, and **in that** the hollow axle (20) is secured with its non-rounded outer contour non-rotatably in a bearing bush (13) with an aperture adapted to the non-rounded outer contour.

5. Washing dryer according to one of Claims 1 to 4,

characterised in that

the hollow axle (20) and the securing members (30) extend over an angular range of more than 180°.

6. Washing dryer according to one of Claims 1 to 5,

characterised in that

the hollow axle (20) is provided on the end remote from the roller (15) with engagement apertures (25) into which there resiliently engage engagement members (18) of a bearing bush (13), accommodating the hollow axle (20) of a bearing flange (12) of the casing portion (11).

7. Washing dryer according to one of Claims 1 to 6,

characterised in that

the securing member (30), with the retaining projection (32) and the engagement projection (31), is produced as a one-piece plastics injection moulded part.

8. Washing dryer according to one of Claims 1 to 7,

characterised in that

the hollow axle (20) is in the form of a hardened stamped and shaped part.

Patentansprüche

1. Wäschetrockner mit einer Trommel, die drehbar befestigt ist, sich drehen kann und zusätzlich in der Nähe der Wäscheingabeseite mittels Rollen (15) geführt wird, die sich auf der Trommelschale (10)

abstützen und auf Lagerachsen drehbar befestigt sind, die an einem die Wäscheingabeöffnung umgebenden Gehäuseteil (11) festgelegt sind,

dadurch gekennzeichnet, dass

- die Lagerachse die Form einer Hohlachse (20) hat, die im Querschnitt C-förmig ausgebildet ist und in die in der Nähe der Lagerbohrung (17) der Rolle (15) ein ölgesättigter Filzblock (40) eingefügt ist,
- der Filzblock (40) aus der Hohlachse (20) herausragt und sich an der Lagerbohrung (17) der Rolle (15) federnd abstützt,
- die Rolle (15) auf der Hohlachse (20) mittels zweier Sicherungsglieder (30) axial positioniert ist und
- die Sicherungsglieder (30) mit Rückhaltevorsprüngen (32) versehen sind, die durch Öffnungen (26) in der Hohlachse (20) in diese Hohlachse ragen und den Filzblock (40) axial sichern.

2. Wäschetrockner nach Anspruch 1,

dadurch gekennzeichnet,

dass die Sicherungsglieder (30) bogenförmig ausgebildet und auf den einander zugewandten Innenseiten ihrer Beine mit Eingriffsvorsprüngen (31) versehen sind, die in gegenüberliegende Eingriffsöffnungen (23 oder 24) der Hohlachse (20) federnd eingreifen.

3. Wäschetrockner nach Anspruch 1 oder 2,

dadurch gekennzeichnet,

dass die Rückhaltevorsprünge (32) und die Eingriffsvorsprünge (31) der Sicherungsglieder (30) sowie die Öffnungen (26) und Eingriffsöffnungen (23, 24) der Hohlachse (20) rechteckförmige Querschnitte aufweisen, die miteinander koordiniert sind.

4. Wäschetrockner nach einem der Ansprüche 1 bis 3,

dadurch gekennzeichnet,

dass die freien Längskanten der Hohlachse (20) abgebogene Randstreifen (21, 22) aufweisen, die aufeinander ausgerichtet sind und in einer gemeinsamen Ebene liegen, und dass die Hohlachse (20) mit ihrer unrunder Außenkontur in einer Lagerbuchse (13) unverdrehbar gesichert ist, die mit einer an die unrunder Außenkontur angepassten Öffnung versehen ist.

5. Wäschetrockner nach einem der Ansprüche 1 bis 4,

dadurch gekennzeichnet,

dass die Hohlachse (20) und die Sicherungsglieder (30) über einen Winkelbereich von mehr als 180° verlaufen.

6. Wäschetrockner nach einem der Ansprüche 1 bis 5,

dadurch gekennzeichnet,

dass die Hohlachse (20) am rollenfernen Ende mit Eingriffsöffnungen (25) versehen ist, in die Eingriffsglieder (18) einer Lagerbuchse (13) federnd eingreifen, die die Hohlachse (20) an einem Lagerflansch (12) des Gehäuseteils (11) festlegt.

7. Wäschetrockner nach einem der Ansprüche 1 bis 6,

dadurch gekennzeichnet,

dass das Sicherungsglied (30) mit dem Rückhaltevorsprung (32) und dem Eingriffsvorsprung (31) einstückig als Kunststoffspritzteil hergestellt ist.

8. Wäschetrockner nach einem der Ansprüche 1 bis 7,

dadurch gekennzeichnet,

dass die Hohlachse (20) die Form eines gehärteten, gestanzten und geformten Teils hat.

Revendications

1. Sécheur de lavage ayant un tambour monté afin qu'il puisse tourner et qui peut être entraîné en rotation, qui est en outre guidé au voisinage du côté d'admission par des rouleaux (15) qui sont supportés sur l'enveloppe (10) du tambour et qui sont montés afin qu'ils puissent tourner sur des axes de palier dans une partie de boîtier (11) entourant l'ouverture d'admission,

caractérisé

en ce que l'axe de palier est sous forme d'un axe creux (20) ayant une section en C et dans lequel est inséré, au voisinage du trou (17) de palier du rouleau (15), un bloc de feutre (40) saturé en huile,

en ce que le bloc de feutre (40) dépasse de l'axe creux (20) et est supporté élastiquement dans le trou de palier (17) du rouleau (15), en ce que le rouleau (15) est positionné axialement sur l'axe creux (30) par deux organes de fixation (30), et en ce que les organes de fixation (30) ont des saillies de retenue (32) qui dépassent par des orifices (26) de l'axe creux (20), dans l'axe et fixent axialement le bloc de feutre (40).

2. Sécheur de lavage selon la revendication 1, **caractérisé en ce que** les organes de fixation (30) ont une forme courbe et comportent, aux faces internes en regard de leurs branches, des saillies de coopération (31) qui coopèrent élastiquement avec des orifices de coopération (23 ou 24) opposés mutuellement et formés dans l'axe creux (20).

3. Sécheur de lavage selon la revendication 1 ou 2, **caractérisé en ce que** les saillies de retenue (32) et les saillies de coopération (31) des organes de fixation (30), et les orifices (26) et les orifices de coopération (23, 24) de l'axe creux (20) ont des sec-

tions rectangulaires qui se correspondent.

4. Sécheur de lavage selon l'une des revendications 1 à 3, **caractérisé en ce que** les bords longitudinaux libres de l'axe creux (20) rejoignent des rebords (21, 22) alignés l'un vers l'autre et se trouvant dans un même plan, et **en ce que** l'axe creux (20) est fixé par son profil externe non circulaire dans un manchon de palier (13) afin qu'il ne puisse pas tourner, le manchon de palier ayant un orifice correspondant au profil externe non circulaire.

5. Sécheur de lavage selon l'une des revendications 1 à 4, **caractérisé en ce que** l'axe creux (20) et les organes de fixation (30) s'étendent sur une plage angulaire supérieure à 180°.

6. Sécheur de lavage selon l'une des revendications 1 à 5, **caractérisé en ce que** l'axe creux (20) comporte, à l'extrémité distante du rouleau (15), des orifices de coopération (25) avec lesquels coopèrent élastiquement des organes de coopération (18) d'un manchon de palier (13) qui loge l'axe creux (20) sur un flasque de support (12) de la partie de boîtier (11).

7. Sécheur de lavage selon l'une des revendications 1 à 6, **caractérisé en ce que** l'organe de fixation (30), avec la saillie de retenue (32) et la saillie de coopération (31), est produit sous forme d'une pièce de matière plastique moulée par injection en une seule pièce.

8. Sécheur de lavage selon l'une des revendications 1 à 7, **caractérisé en ce que** l'axe creux (20) est sous forme d'une pièce emboutie et mise en forme trempée.

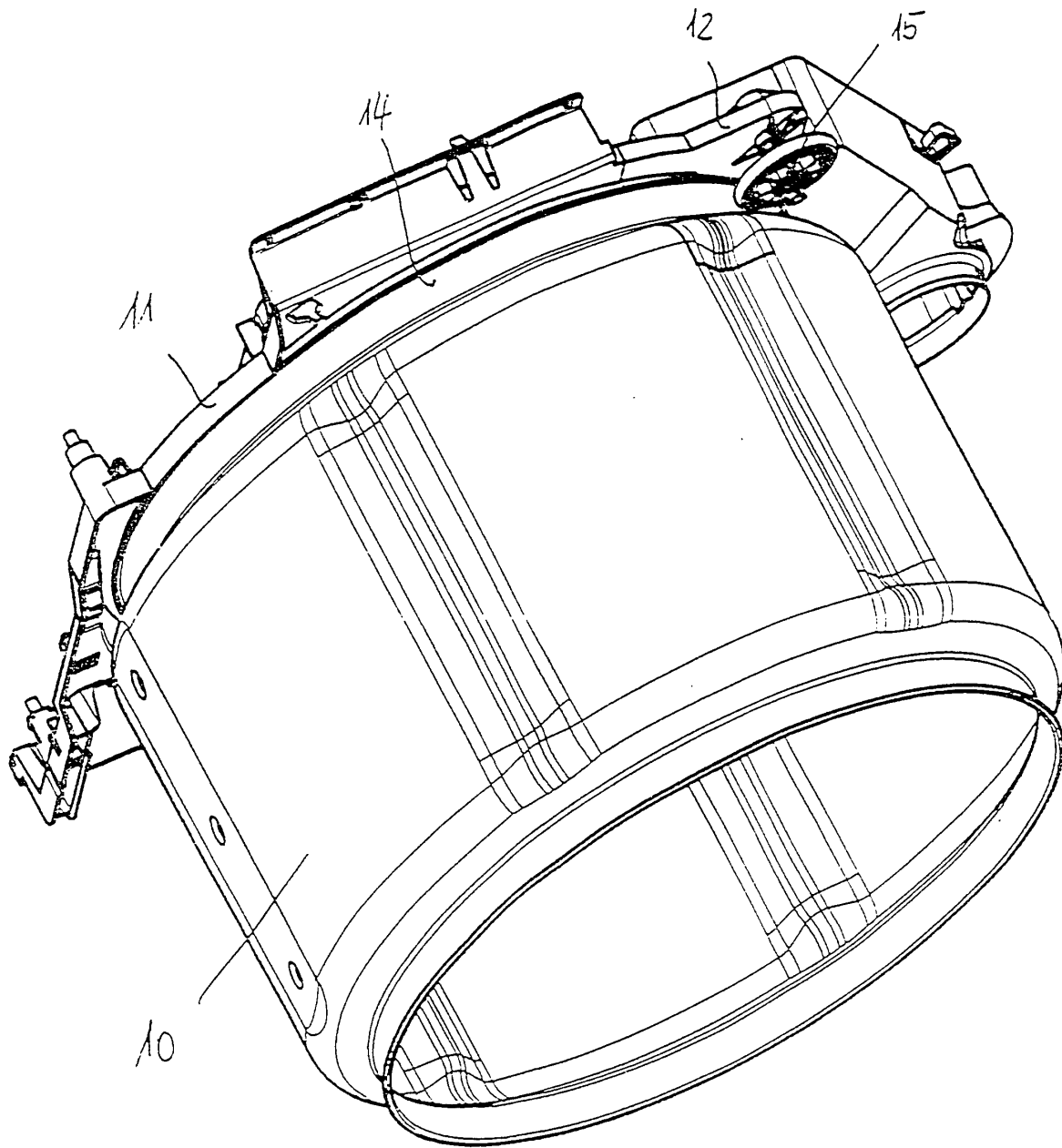


Fig. 1

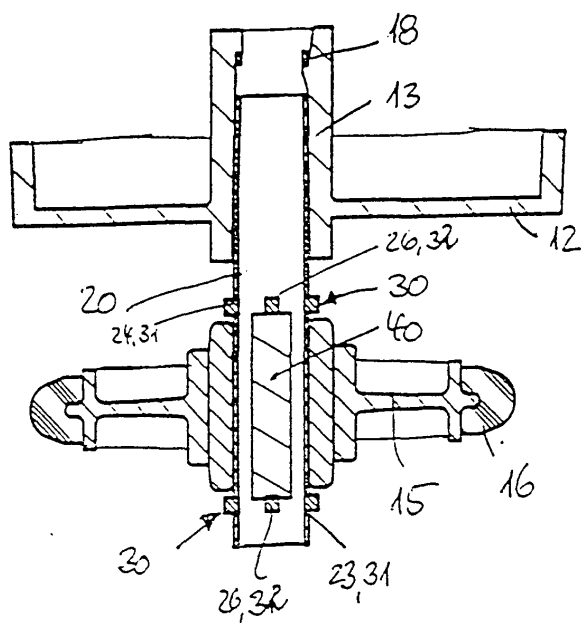


Fig. 5

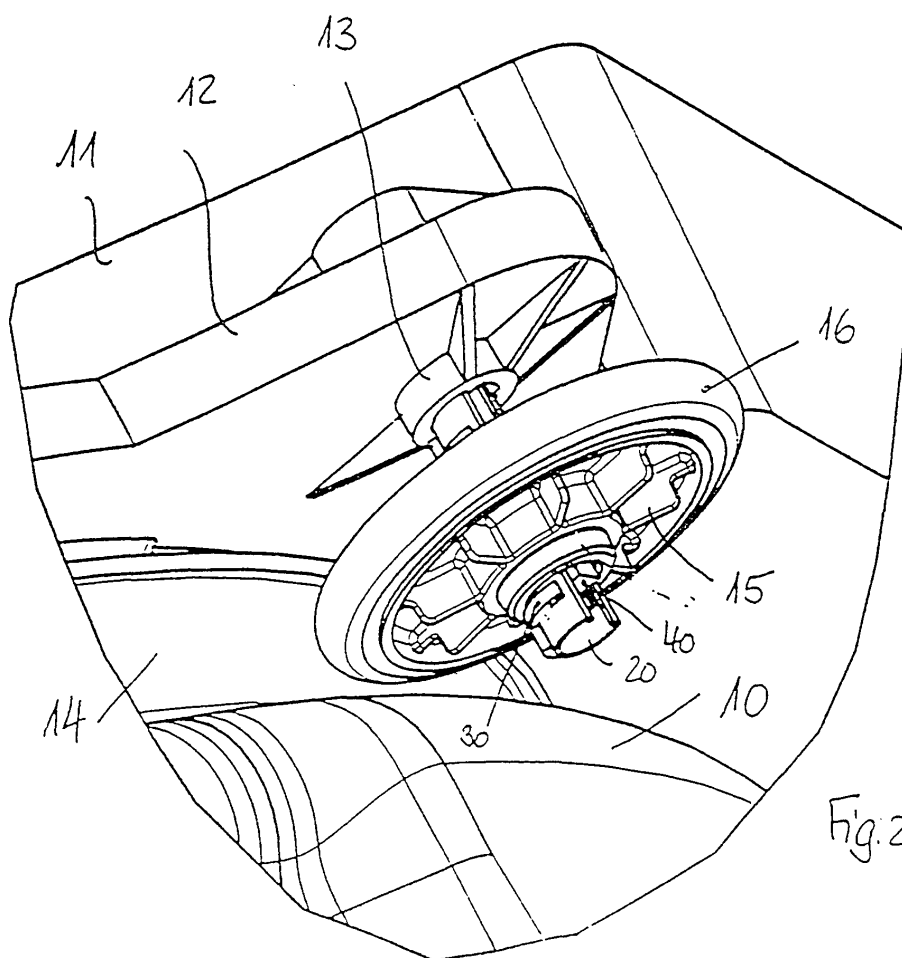


Fig. 2

