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(54) Handle assembly for power tool

Griffanordnung für ein elektrisches Werkzeug

Assemblage de poignée pour outil électrique

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Description

[0001] The present invention relates to a handle assembly for a power tool according to the preamble of claim 1, and relates particularly, but not exclusively, to a vibration damping handle assembly for use with a hammer power drill.

[0002] Such a handle assembly is known from US2629364. DE 102009000598 discloses a supplementary handle for a hammer power drill having a vibration damping arrangement comprising a torsion spring provided at each axial end of a mount for the handle.

[0003] This arrangement suffers from the drawback that the torsion springs must be highly robust, thereby increasing the cost of manufacture of the apparatus, and it is difficult to control the flexibility of the spring over a wide range of handle positions.

[0004] Preferred embodiments of the present invention seek to overcome one or more of the above disadvantages of the prior art.

[0005] US2629364, US2007/143966 and EP0156387 all disclose vibration dampening techniques for handles on power tools.

[0006] According to the present invention, there is provided a handle assembly in accordance with claim 1.

[0007] By providing a vibration damping mechanism comprising at least one elongate biasing member having at least one respective resilient portion extending without coiling thereof from said first mounting portion to said second mounting portion and adapted to engage said third mounting portion such that pivoting of the handle relative to the support member causes deformation of said resilient portion causing said resilient portion to oppose said pivoting of the handle relative to the support member, this provides the advantage of enabling simpler, more cost effective construction of the apparatus while enabling the apparatus to be more robust. The advantage is also provided of enabling greater control of the vibration damping properties over a wider range of handle positions.

[0008] At least one said resilient torsion member may comprise at least one respective resilient sheet material.

[0009] This provides the advantage of enabling simpler construction of the resilient member by enabling it to be formed by stamping.

[0010] At least one said resilient torsion member may further comprise at least one enlarged portion adapted to be mounted to the support member and/or at least one mounting portion by means of screws.

[0011] This provides the advantage of enabling stresses applied to the resilient member to be spread over a larger surface area, thereby making the device more robust.

[0012] The handle and support member may be adapted to form a loop.

[0013] The apparatus may further comprise at least one limiting device for limiting pivoting movement of the handle relative to the support member.

[0014] At least one said limiting device may include at least one respective abutment member on the handle and/or the support member.

[0015] A preferred embodiment of the invention will now be described, by way of example only and not in any limitative sense, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a handle assembly of a first embodiment of the present invention;
Figure 2 is a top view of the assembly of Figure 1;
Figure 3 is a side view of the assembly of Figure 1;
Figure 4 is a cross sectional view along the line A-A in Figure 3;

Figure 5 is a cross sectional view along the line C-C in Figure 3;

Figure 6 is a cross sectional view along the line B-B in Figure 3;

[0016] Referring to Figures 1 to 6, a handle assembly 2 for mounting a handle 4 to a forward part of a housing (not shown) of a power tool such as a hammer drill comprises a support member comprising a base 6 of durable plastics material having a generally partially cylindrical part 8 for abutting the housing of the power tool, and a flexible metal strap 10 which wraps around the housing to retain the base 6 in position on the housing. The strap 10 is tightened or slackened by means of a rotatable knob 12. The handle 4 has a grip 14 of suitable plastics material and first and second mounting parts 16 pivotably attached to the base 6 by means of a torsion spring 18 (Figures 5 and 6). The torsion spring 18 comprises a flat sheet of resilient metal such as steel having a central enlarged portion 20 and enlarged portions 22 at its ends.

[0017] The mounting parts 16 of the handle 4 are pivotably mounted to a third mounting part 24 on the base 6 such that the enlarged portions 22 of the torsion spring 18 are received in respective first and second mounting parts 16. The enlarged portions 22 of the torsion spring 18 are attached to the first and second mounting parts 16 by means of screws 26, and the enlarged portion 20 at the centre of the torsion spring 18 is attached to the third mounting part 24 by means of a screw (not shown). The ends of the first and second mounting parts 16 are closed by end caps 28 which are slidably received in respective apertures in the mounting parts 16.

[0018] When no load is applied to the grip 14, the torsion spring 18 remains flat and the grip 14 remains in its rest position. However, when pressure is applied to the grip 14, the mounting parts 16 at the respective ends of the grip 14 cause the enlarged portions 22 at the ends of the torsion spring 18 to twist around the longitudinal axis of the torsion spring 18 relative to the enlarged portion 20 at the centre of the torsion spring 18, and twisting movement of the torsion spring 18 damps the transmission of vibrations from the body of the power tool via the base 6 to the grip 14.

[0019] Referring now to Figure 4, a clamping mecha-

nism 30 for mounting the base 6 to the housing of the power tool is shown in greater detail. The clamping mechanism 30 includes a pair of wedges 32 of triangular cross section which are attached to respective ends of the metal strap 10. The wedges 32 are located in respective recesses 34 in the base 6, the length of the recess 34 in a direction transverse to the pivot axis 36 of the grip 14 being longer than the wedge 32. As a result, a gap 38 is provided between the end of the recess 34 and the end of the wedge 32, and each wedge 32 is slidable relative to the base 6 by means of inclined surfaces 40 on the base 6. Each wedge 32 is provided with an aperture 42 through which a bolt 44 passes, the bolt 44 extending from a head 46 which non-rotatably engages the external surface of the base 6, through the wedges 32 and through an aperture 50 through the base 6, and engages an internal bore 48 in the rotatable knob 12 by means of mutually engaging screw threads on the end of the bolt 44 and the internal bore 48 of the knob 12. Rotation of the knob 12 in a first direction causes the knob 12 to move axially along the bolt 44, urging the wedges 32 towards each other. As a result, the wedges 32 slide along the inclined surfaces 40 on the base 6 and move away from the part cylindrical support 8 on the base 6. This draws the ends of the metal strap 10 with the wedges 32 into the base 6, as a result of which the length of the strap 10 is shortened and the strap 10 is tightened around the housing of the power tool to clamp the handle 4 in position relative to the housing. The aperture 50 through the base 6 has an elongated cross section, such as an oval shape, to accommodate movement of the bolt 44 in a transverse direction relative to the axis 36 of rotation of the grip 14. Rotation of the knob 12 in the opposite direction enables the wedges 32 to be moved in an opposite direction relative to the base 6 to loosen the strap 10 around the housing of the tool to enable the position of the handle 4 to be adjusted.

Claims

1. A handle assembly for a power tool, the handle assembly comprising:-

a support member (6) adapted to be mounted to a body of a power tool for supporting a handle on the power tool;
 a handle (4) adapted to be pivotably mounted to the support member (6), wherein first and second mounting portions (16) on one of the handle (4) and the support member (6) are pivotably mounted to respective ends of a third mounting portion (24) on the other of the handle (4) and the support member (6); and
 a vibration damping mechanism comprising at least one elongate biasing member (18) having at least one respective resilient portion extending without coiling thereof from said first mount-

ing portion (16) to said second mounting portion (16) and adapted to engage said third mounting portion (24), the handle being capable of pivoting relative to the support member (6) to cause deformation of said resilient portion, said resilient portion opposing said pivoting of the handle (4) relative to the support member (6);

characterised in that said elongate biasing member (18) is an elongate resilient torsion member having a first part mounted to the third mounting portion (24) and a respective second part (22) mounted to each of said first and second mounting portions (16) such that pivoting of the handle (4) relative to the support member (6) causes twisting of the elongate resilient torsion member to resiliently oppose pivoting of the handle (4) relative to the support member (6).

2. An assembly according to claim 1, wherein at least one said resilient torsion member comprises at least one respective resilient sheet material.
3. An assembly according to claim 1 or 2, wherein at least one said resilient torsion member further comprises at least one enlarged portion (20, 22) adapted to be mounted to at least one mounting portion (16, 24) by means of screws.
4. An assembly according to any one of the preceding claims, wherein the handle (4) and support member (6) are adapted to form a loop.
5. An assembly according to any one of the preceding claims, further comprising at least one limiting device for limiting pivoting movement of the handle (4) relative to the support member (6).
6. An assembly according to claim 5, wherein at least one said limiting device includes at least one respective abutment member on the handle and/or the support member.

Patentansprüche

1. Griffanordnung für ein elektrisches Werkzeug, wobei die Griffanordnung umfasst:

- ein Stützelement (6), das zur Montage an einen Körper eines Elektrowerkzeuges angepasst ist, zum Stützen eines Griffs an dem Elektrowerkzeug;
 - einen Griff (4), der zur schwenkbaren Montage an dem Stützelement (6) angepasst ist, wobei ein erster und ein zweiter Montagebereich (16) an einem von dem Griff (4) und dem Stützelement (6) an entsprechenden Enden eines dritten Montagebereichs (24) an dem anderen von dem

Griff (4) und dem Stützelement (6) schwenkbar montiert sind; und

- einen Vibrationsdämpfungsmechanismus, der mindestens ein längliches Vorspannelement (18) mit mindestens einem entsprechenden elastischen Bereich umfasst, der sich ohne ein Aufwickeln davon von dem ersten Montagebereich (16) zu dem zweiten Montagebereich (16) erstreckt und dazu angepasst ist, mit dem dritten Montagebereich (24) in Eingriff zu stehen,

- wobei der Griff relativ zu dem Stützelement (6) geschwenkt werden kann, um eine Verformung des elastischen Bereichs zu bewirken, wobei der elastische Bereich dem Schwenken des Griffs (4) relativ zu dem Stützelement (6) entgegenwirkt;

- **dadurch gekennzeichnet, dass** das längliche Vorspannelement (18) ein längliches elastisches Torsionselement ist mit einem ersten Teil, der an dem dritten Montagebereich (24) montiert ist, und einem entsprechenden zweiten Teil (22), der an jeden von dem ersten und den zweiten Bereich (16) montiert ist, so dass ein Schwenken des Griffs (4) relativ zu dem Stützelement (6) ein Verdrehen des länglichen elastischen Torsionselements bewirkt, um dem Schwenken des Griffs (4) relativ zu dem Stützelement (6) elastisch entgegenzuwirken.

2. Griffanordnung nach Anspruch 1, wobei mindestens ein elastisches Torsionselement mindestens ein entsprechendes elastisches Plattenmaterial umfasst.

3. Griffanordnung nach Anspruch 1 oder 2, wobei mindestens ein elastisches Torsionselement ferner mindestens einen vergrößerten Bereich (20, 22) umfasst, der dazu angepasst ist, an mindestens einem Montagebereich (16, 24) durch Schrauben montiert zu sein.

4. Griffanordnung nach einem der vorhergehenden Ansprüche, wobei der Griff (4) und das Stützelement (6) dazu angepasst sind, eine Schleife zu bilden.

5. Griffanordnung nach einem der vorhergehenden Ansprüche, ferner umfassend mindestens eine Begrenzungsvorrichtung zum Begrenzen der Schwenkbewegung des Griffs (4) relativ zu dem Stützelement (6).

6. Griffanordnung nach Anspruch 5, wobei mindestens eine Begrenzungsvorrichtung mindestens ein entsprechendes Widerlagerelement an dem Griff und/oder dem Stützelement umfasst.

Revendications

1. Ensemble à poignée pour un outil électrique, l'ensemble à poignée comprenant :

un élément de support (6) adapté pour être monté sur le corps d'un outil électrique afin de supporter une poignée sur l'outil électrique ;
une poignée (4) adaptée pour être montée à pivotement sur l'élément de support (6), dans lequel une première et une deuxième partie de montage (16) sur l'une et l'autre de la poignée (4) et de l'élément de support (6) sont montées à pivotement aux extrémités respectives d'une troisième partie de montage (24) sur l'autre de la poignée (4) et de l'élément de support (6) ; et un mécanisme d'amortissement des vibrations comprenant au moins un élément de sollicitation allongé (18) ayant au moins une partie élastique respective s'étendant sans enroulement de ladite première partie de montage (16) à ladite deuxième partie de montage (16) et adaptée pour s'engager sur ladite troisième partie de montage (24), la poignée étant à même de pivoter par rapport à l'élément de support (6) pour provoquer la déformation de ladite partie élastique, ladite partie élastique s'opposant audit pivotement de la poignée (4) par rapport à l'élément de support (6) ;

caractérisé en ce que ledit élément de sollicitation allongé (18) est un élément de torsion élastique allongé ayant une première partie montée sur la troisième partie de montage (24) et une seconde partie respective (22) montée sur chacune desdites première et deuxième parties de montage (16) de sorte que le pivotement de la poignée (4) par rapport à l'élément de support (6) amène la torsion de l'élément de torsion élastique allongé à s'opposer de manière élastique au pivotement de la poignée (4) par rapport à l'élément de support (6).

2. Ensemble selon la revendication 1, dans lequel au moins un dit élément de torsion élastique comprend au moins un matériau en feuille élastique respectif.

3. Ensemble selon la revendication 1 ou 2, dans lequel au moins un dit élément de torsion élastique comprend en outre au moins une partie élargie (20, 22) adaptée pour être montée sur au moins une partie de montage (16, 24) au moyen de vis.

4. Ensemble selon l'une quelconque des revendications précédentes, dans lequel la poignée (4) et l'élément de support (6) sont adaptés pour former une boucle.

5. Ensemble selon l'une quelconque des revendica-

tions précédentes, comprenant en outre au moins un dispositif de limitation pour limiter le mouvement pivotant de la poignée (4) par rapport à l'élément de support (6).

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6. Ensemble selon la revendication 5, dans lequel au moins un dit dispositif de limitation comprend au moins un élément de butée respectif sur la poignée et/ou l'élément de support.

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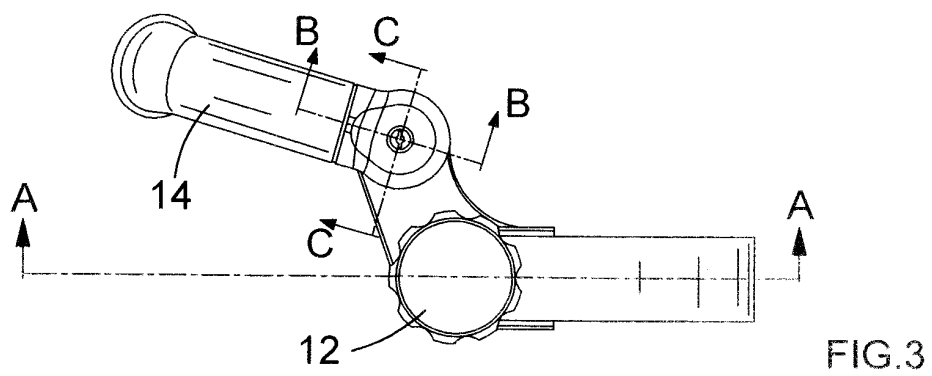
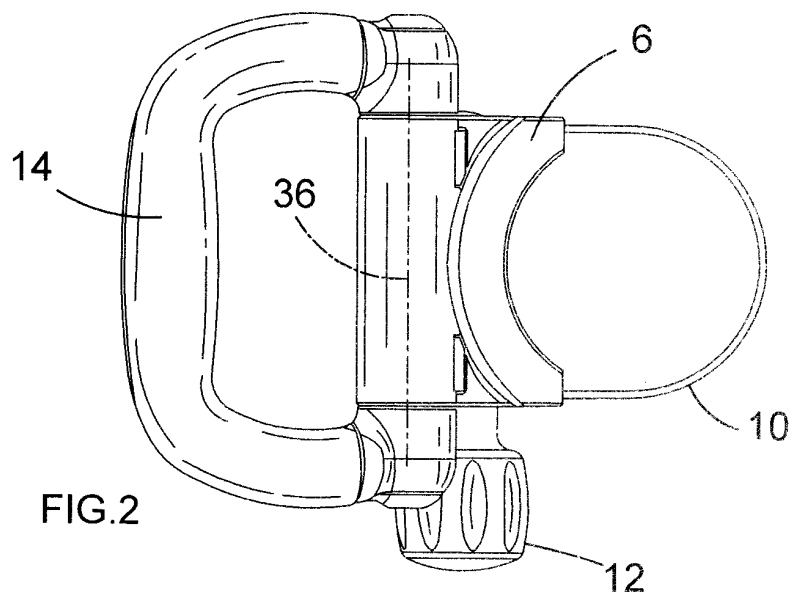
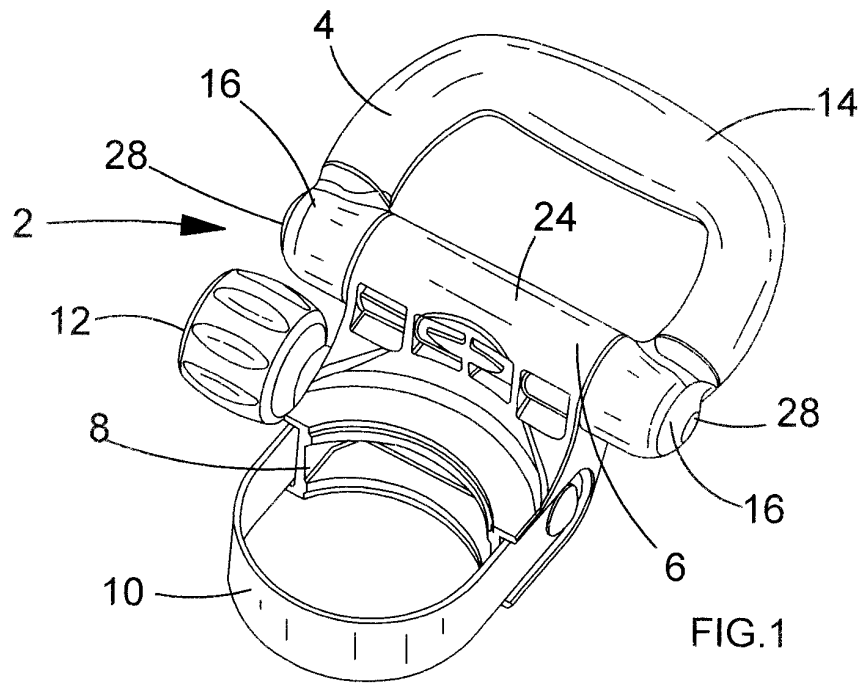
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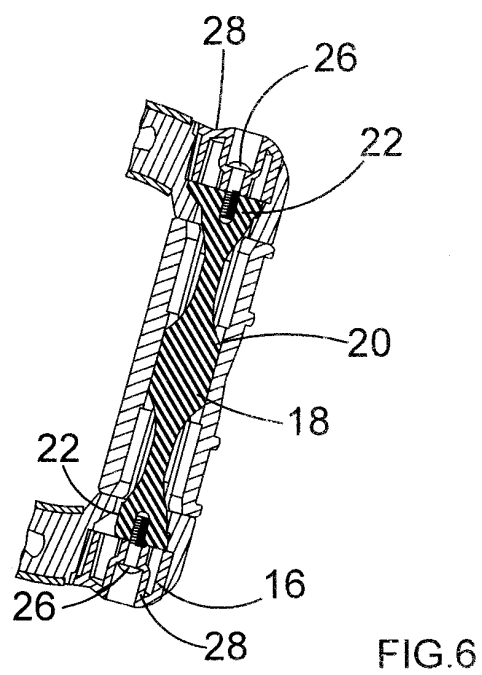
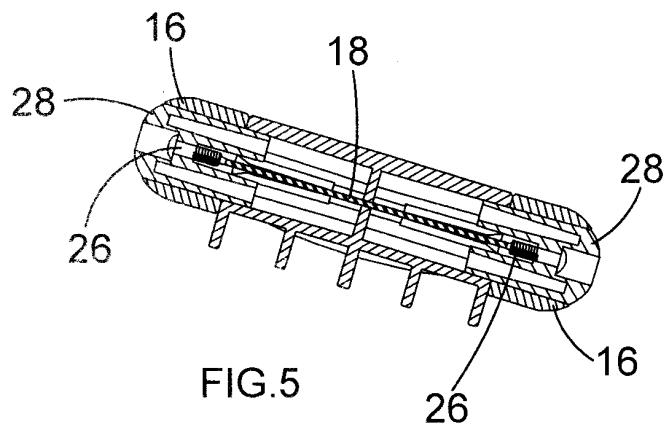
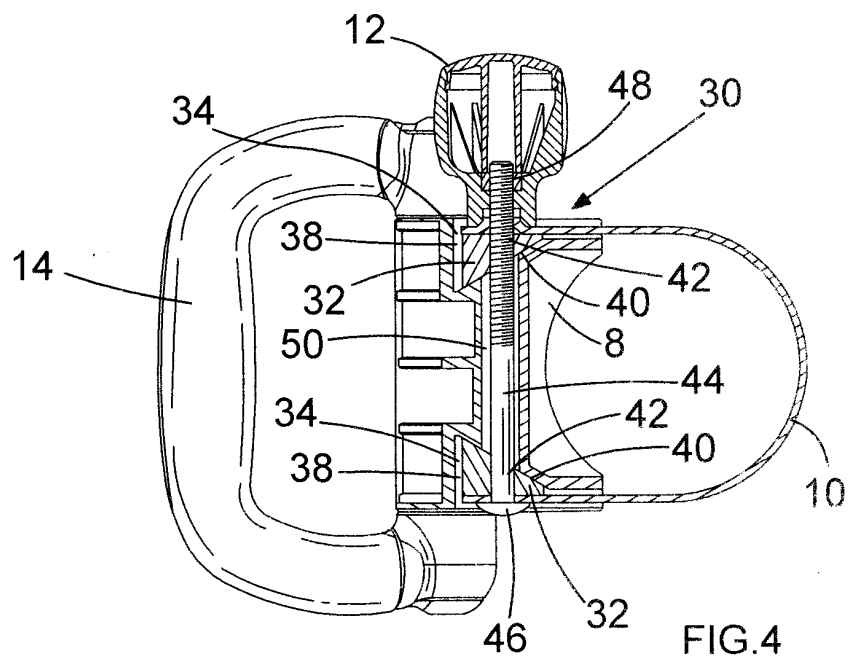
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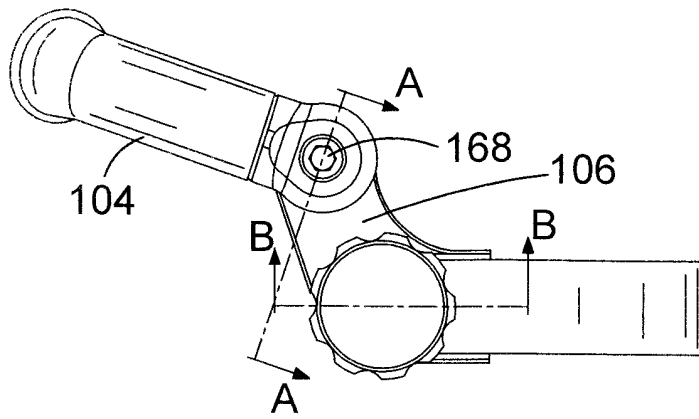


FIG. 7

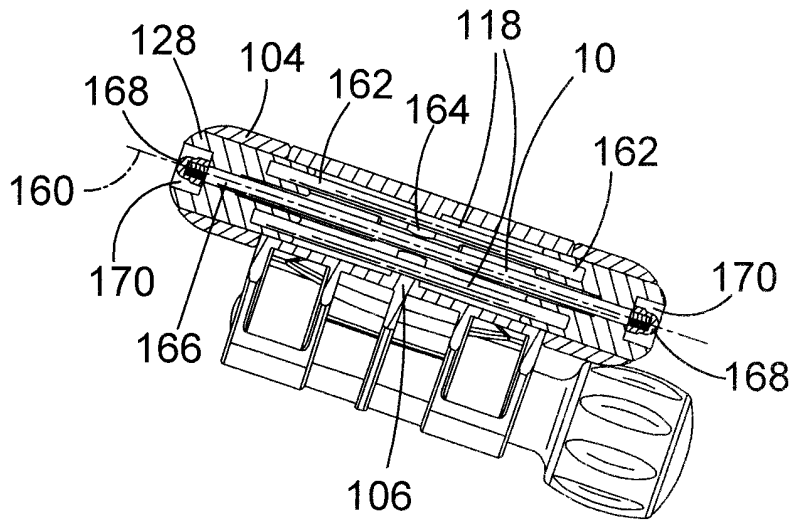


FIG. 8

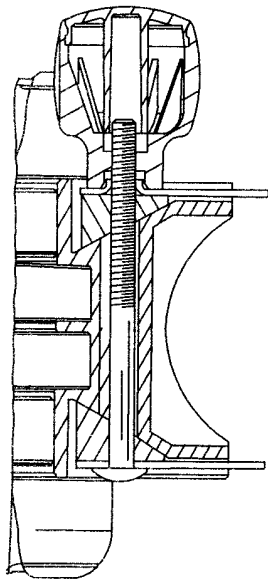


FIG. 9

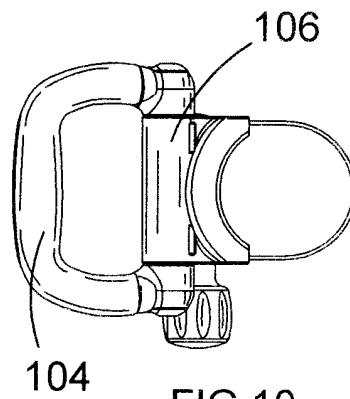


FIG. 10

REFERENCES CITED IN THE DESCRIPTION

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