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(54) Title: CLAMP JOINT

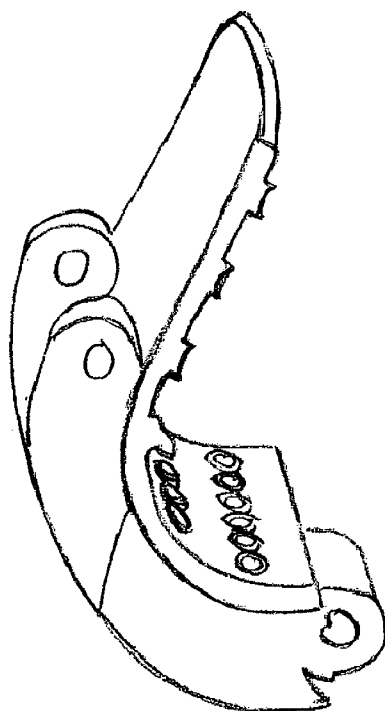


Fig. 5

(57) Abstract: The present invention relates to a clamp joint including at least two components which are hinged together and may form a U-shaped part adapted to grab around an elongated cylindrical body, wherein a first component 1 includes a locking flap 4, a second component 3 includes a locking hook 5, the locking flap 4 and the locking hook being adapted to engage each other when the clamp joint is locked around the cylindrical body, the clamp joint further including a gasket 6 of an elastic material, the gasket being adapted to be mounted in one of the components 1, 3, as an outer side of the gasket has a shape which fits the inner shape of the corresponding component, and the gasket having an inner side including a number of suction cups 7.

## Clamp joint

The present invention relates to a clamp joint intended to grab around a cylindrical body, such as a rod or pipe, and hold it.

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Presently, there is a product in trade called "Easylifter", Norwegian Design Registration 79052. This is an additional handle intended to be fastened at the front of the ordinary shaft of a spade or snow shovel. The user may then work with the back more straightened. The additional handle is fastened with a clamp joint. This clamp joint  
10 grabs well around shafts of 38 mm diameter, but is limited to shafts of exactly this diameter, which means that the clamp joint cannot be used on shafts with a little larger or smaller diameter. This limits the scope of the Easylifter to tools of one size.

Thus, it is an object of the present invention to devise a clamp joint that may be used on  
15 cylindrical bodies of varying diameters.

This is achieved in a clamp joint such as defined in the appended claims.

The invention will now be described in detail in reference to the appended drawings, in  
20 which:

Fig. 1 shows the Easylift in perspective (prior art),

Fig. 2 shows the clamp joint when opened (prior art),

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Fig. 3 shows the clamp joint when closed (prior art),

Fig. 4 shows a gasket which is fitted to a component of the clamp joint,

30 Fig. 5 shows the gasket inserted into said component,

Fig. 6 shows the gasket in detail,

Fig. 7 shows a clamp joint equipped with several gaskets,

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Fig. 8 shows an adapter,

Fig. 9 shows the adapter provided with a gasket,

40 The Easylifter, as it is illustrated in Fig. 1, is an additional handle which is clamped forward on the shaft of e.g. a snow shovel. The clamp joint itself, as it is illustrated in Fig. 2, includes a U-shaped part with three components 1, 2, 3 hinged together. The components have an inner shape adapted to the round shape of a shaft. In addition, the

first component 1 has a hinged locking flap 4. When the clamp joint is pressed together around a shaft, the locking flap 4 will be brought behind a locking hook 5 on the third component 3, and be turned down towards the outside of the first component, see Fig. 3. The second component 2 has holes for fastening the handle itself.

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According to the invention, at least one of the components is provided with a gasket, the gasket being placed on the inside of the component between the U-shaped part and the cylindrical body that is to be fixed. The gasket is made of an elastic material, such as rubber or another material suited for the purpose. The outside of the gasket is adapted to the shape of the corresponding component in the U-shaped part with supporting ribs, etc., so that the gasket may be mounted in the component and fixed as it fills the space between the component and the cylindrical body. By adding gaskets, a prior art clamp joint may be brought to hold shafts of 30-38 mm diameter or more. Further, the joint may grab and hold shafts that are tapered, i.e. of conical shape.

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Fig. 6 shows the gasket in detail. The gasket is curved according to the shape of the corresponding component in the U-shaped part. The outside is shaped to fill in the inside of the component, and the outside is provided with suction cups projecting from the surface of the gasket. As the suction cups are projecting from the surface, the clamp joint may grab bodies of varying diameter. When the clamp joint is pressed around the cylindrical body, the suction cups are pressed against the support creating a vacuum below at least some of the cups. Thus, the clamp joint will hold very tightly on the cylindrical body.

25 Fig. 7 shows the clamp joint provided with gaskets in all components. It will grab around the whole perimeter of the body that is to be grabbed.

The invention includes a clamp joint that may be used in all situations where there is a need for fixing something to a cylindrical body, this may be to connect something to the body, holding the body fixed, or e.g. joining two cylindrical bodies. The invention is not limited to being used on tool shafts.

Further, there may be any number of components in the clamp joint, with gaskets below all, or an arbitrary number of the components. The gaskets may be adapted to cover the area around its component only, or may be prolonged to cover an area outside the associated component, such as a neighbouring component, or the area below the hinging between the two components.

In order to increase the effect of the clamp joint, the locking flap 4 may be made eccentric around the hinge line forming a cam on the side adjacent to the gasket (not shown). When locking the clamp joint, the locking flap will grab around the back of the locking hook 5 and be pressed inwards so it is approximately tangential with the

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cylindrical body. Simultaneously, the cam at the back of the locking flap will be pressed inwards against the back of the gasket.

5 Fig. 8 shows an adapter that is adapted to be laid into the clamp joint allowing the joint to grab square-shaped bodies. The adapter is made in plastic, in two parts that are joined in a hinge line. It is intended to be laid inside the clamp joint.

10 Fig. 9 shows an adapter which is provided with an inside gasket. The gasket may be designed with a flat or cylindrical inside, allowing it to grab bodies of any shape. The embodiment shown in the figure is designed to grab cylindrical bodies.

Adapters may also be provided in which the inside is circular, i.e. for grabbing cylindrical bodies of smaller diameter, e.g. 12-14 mm. With two layers of gaskets a very stable connection is achieved.

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### C l a i m s

1. A clamp joint including at least two components which are hinged to each other and may form a ring adapted to grab an elongated cylindrical body, wherein a first  
5 component (1) includes a locking flap (4), a second component (3) includes a locking hook (5), the locking flap (4) and the locking hook being adapted to grab each other when the clamp joint is locked around the cylindrical body,  
c h a r a c t e r i z e d i n a gasket (6) of an elastic material, the gasket being  
adapted to be mounted in one of the components (1, 3), an outer side of the gasket  
10 having a shape fitted to an inner shape of the associated component, and the gasket having an inner side including a number of suction cups (7).
2. A clamp joint according to claim 1, wherein the gasket has a basal surface and the suction cups projecting from the basal surface.
- 15 3. A clamp joint according to claim 1, wherein the locking flap is eccentrically hinged to the first component so it will press against the back of the gasket when the clamp joint is closed.
- 20 4. A gasket (6) to be used in a clamp joint,  
c h a r a c t e r i z e d i n that the gasket is made in an elastic material, the outer side is fitted to the shape of the clamp joint, and the inner side comprises a number of suction cups (7).
- 25 5. A gasket according to claim 4, where the gasket has a basal surface and the suction cups are projecting from the basal surface.
6. An adapter for use in a clamp joint, the adapter including two parts which are hinged together, the two parts having an outer surface of a shape corresponding to the  
30 shape of the inner shape of the clamp joint, and the outer shape of the adapter is adapted to the body which is to be held.
7. An adapter according to claim 6, where the adapter includes a gasket provided with suction cups, the gasket being adapted to be placed at the inner side of the adapter.
- 35 8. Use of a clamp joint as claimed in claim 1 in a handle intended to be mounted on a tool.

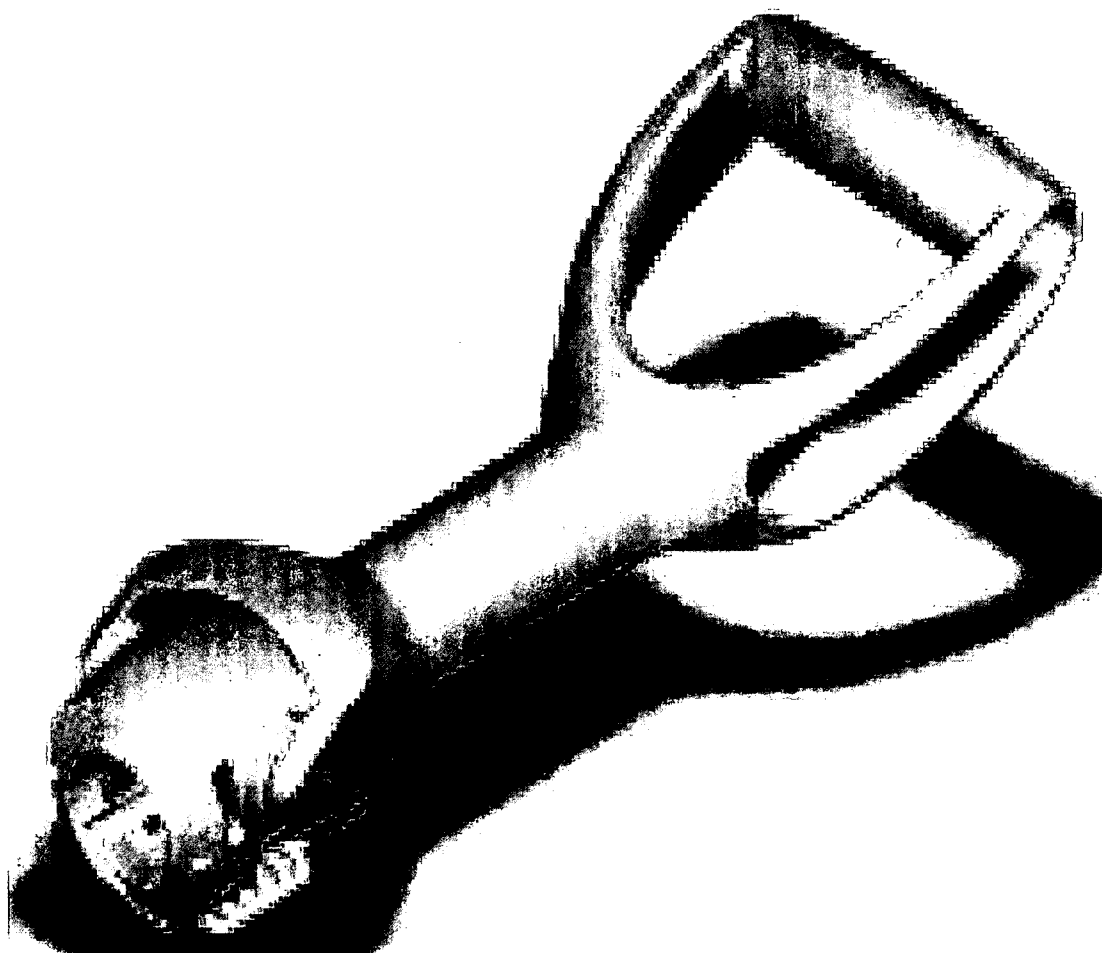


Fig. 1

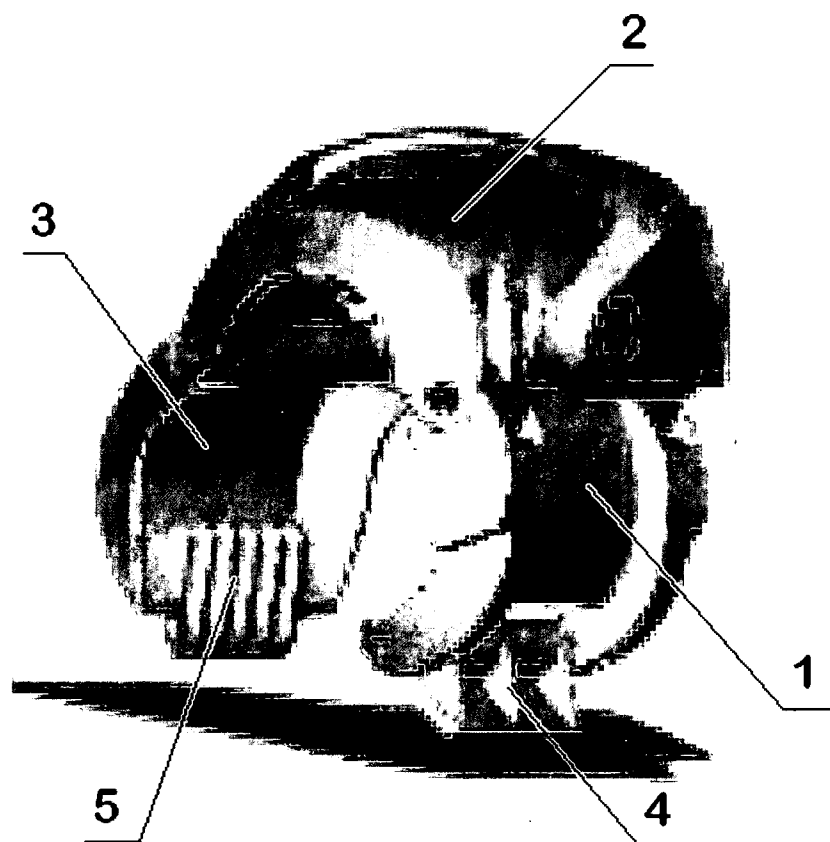


Fig. 2



Fig. 3



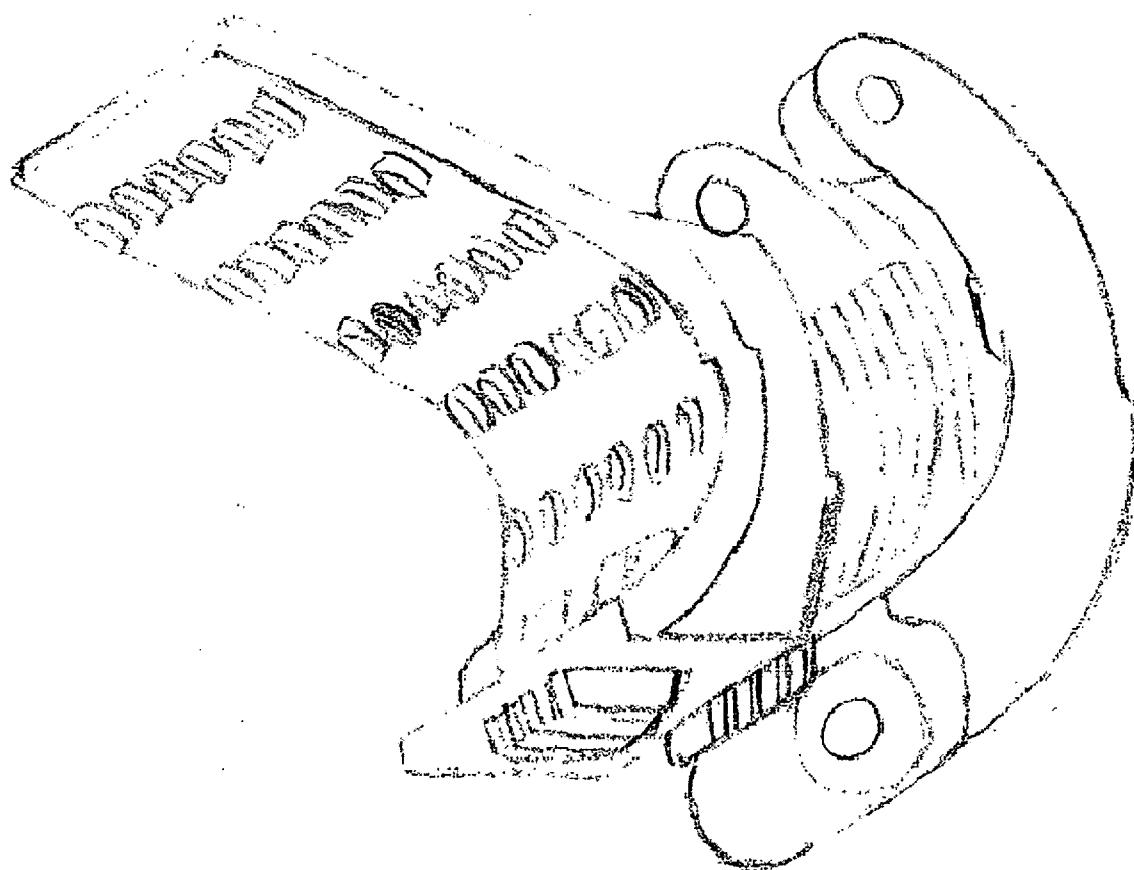


Fig. 4

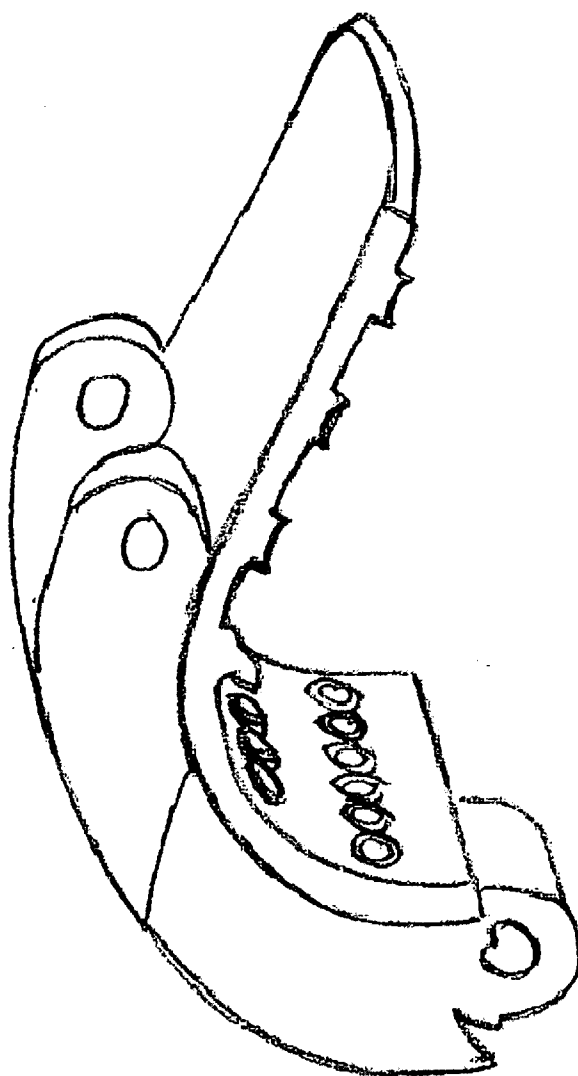


Fig. 5

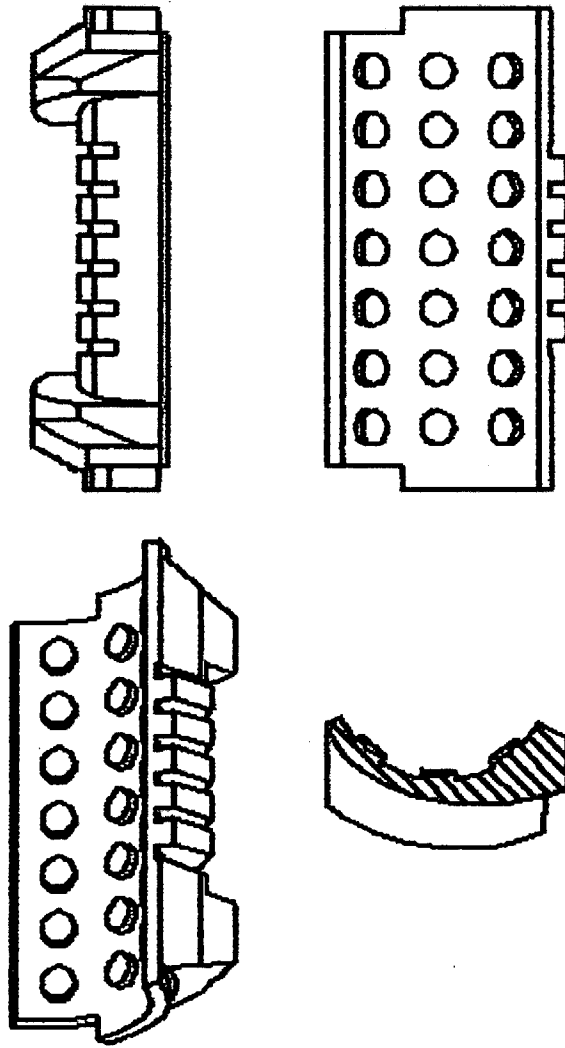


Fig. 6

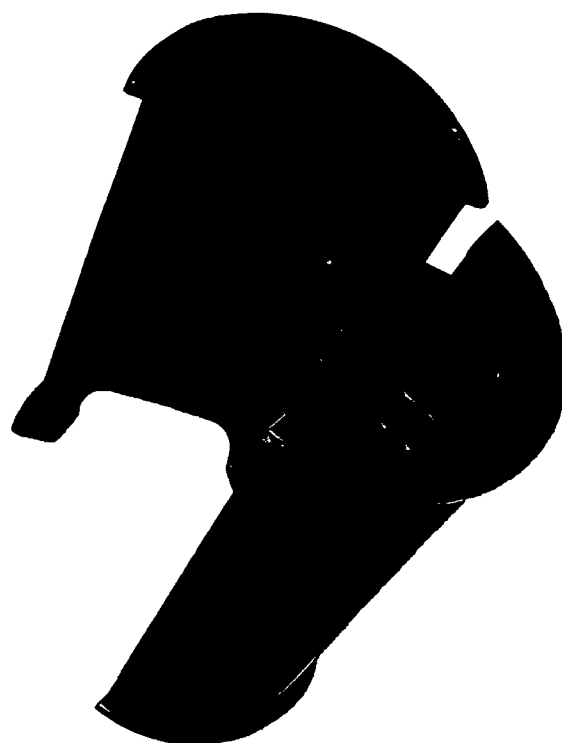


Fig. 7

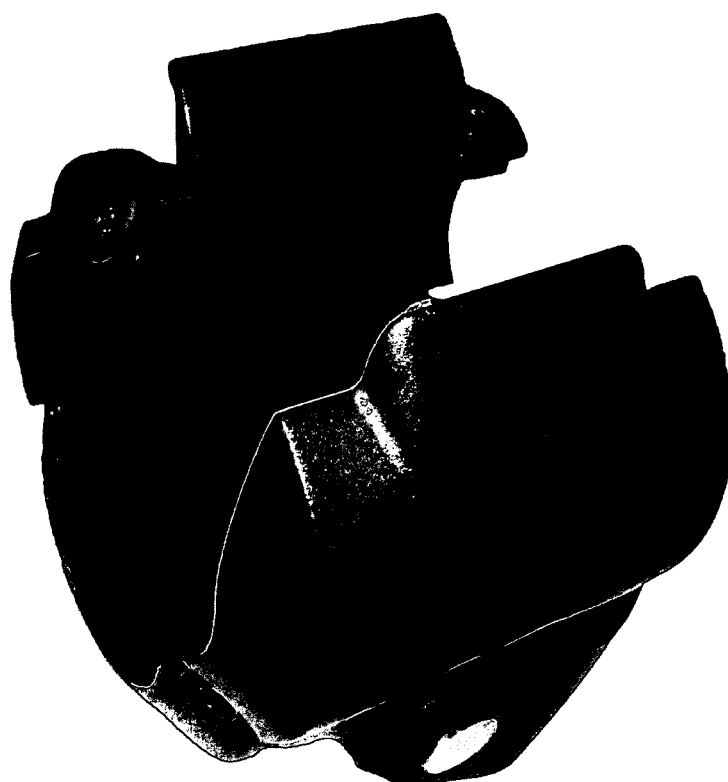


Fig. 8

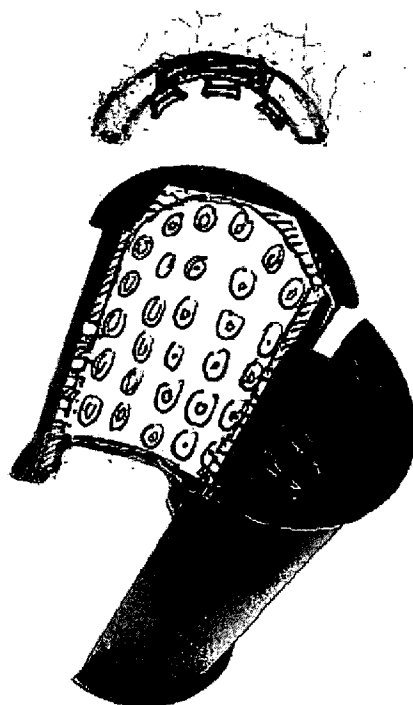


Fig. 9

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO2010/000347

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet

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: B25G, F16B, B25B

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

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Electronic data base consulted during the international search (name of data base and, where practicable, 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. |
|-----------|--|-----------------------|
| A         | EP 1889998 A1 (WEATHERFORD/LAMB, INC.),<br>20 February 2008 (20.02.2008), the whole document<br>--         | 1-8                   |
| A         | US 20070166100 A1 (CONGDON, JOSEPH L.),<br>19 July 2007 (19.07.2007), figure 13, paragraph<br>[0044]<br>-- | 1-8                   |
| A         | US 6079509 A (BEE, ROBERT M. ET AL), 27 June 2000<br>(27.06.2000), the whole document<br>--                | 1-8                   |
| A         | US 20070289103 A1 (STEELMAN, JOEL P.),<br>20 December 2007 (20.12.2007), the whole document<br>--<br>----- | 1-8                   |

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Information on patent family members

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| US    | 20070166100 | A1 | 19/07/2007 | NONE |
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| US    | 6079509     | A  | 27/06/2000 | NONE |
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| US    | 20070289103 | A1 | 20/12/2007 | NONE |
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