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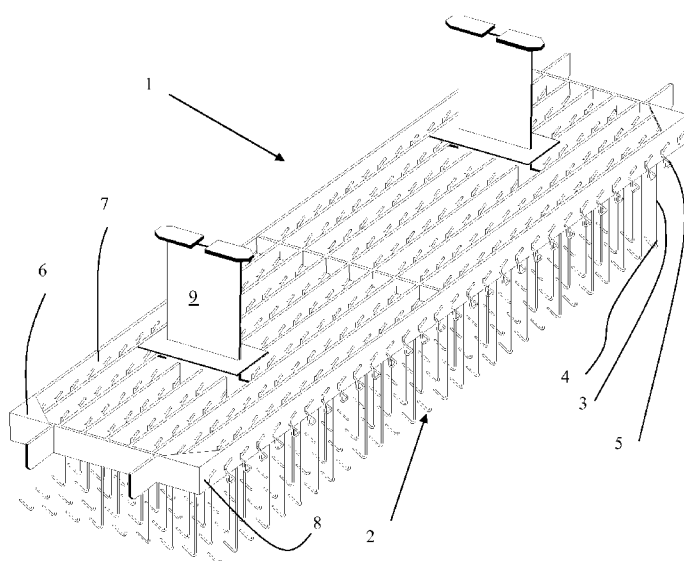
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(54) Title: A DEVICE FOR HOLDING PIECES OF GOODS

Fig. 1



(57) Abstract: Device (1) for holding pieces of goods, while treating the goods during a surface treatment process. The device (1) comprises a plurality of hangers (2), each hanger including an elongated element (3) having one end (4) arranged for the purpose of carrying goods and an opposite end that is bent and provided with a stopping member (5) having a width that is larger than the width of the elongated element (3). The device (1) also comprises a framework (6), including a plurality of rails (7) wherein each rail (7) is provided with a plurality of openings (8) adapted to receive the hangers (2). Some of the openings (8) comprise a first part arranged to receive the stopping member (5) of the hanger (2) while the hanger (2) is threaded to the rails (7) and a second part arranged to keep the bent end of the hanger (2) during the galvanization process. Further the second part of the opening is arranged below the first part of the opening seen from a gravitational point of view, in order to retain the hangers (2) in a predetermined position within the second part of the opening.

A device for holding pieces of goods

TECHNICAL FIELD

The present invention refers to a device for holding pieces of goods while being
5 treated during a surface treatment process, such as painting or galvanization,
of the goods.

BACKGROUND ART

During surface treatment processes of pieces of goods, such as a hot-dip
10 galvanization process, the goods are usually suspended by using a device for
holding the pieces of goods. Such a device includes a framework including a
number of rails which is lowered into a tank holding a bath for treating the
goods. Each rail is perforated with circular shaped holes adapted to the variety
of hangers used for holding the goods. Each hanger comprises an elongated
15 element having one end arranged for the purpose of carrying goods, e.g. a
hook, and an opposite end that is bent and provided with a stopping member
having a width that is larger than the width of the elongated element. The
hangers and the size of the corresponding holes in the rails are usually
designed to prevent the hooks from being unhooked due to vibrations of the
20 goods when hanging over the tank.

The hanging (loading and unloading) procedure of the hangers is performed by
threading each hanger through the circular shaped holes in the rail, starting
with the hook end and then followed by the elongated element and the stopping
25 member. When performing this procedure the elongated part of the hanger
needs to be turned or held almost in an horizontal position at least once during
the procedure. The hanging (loading and unloading) approach and the size of
the hanger determines the distance between the rails and consequently also
the maximum number of rails that can be used in each framework. The process
30 of assembling the hangers to the rails is usually difficult and time-consuming,
especially if the length of the hangers exceeds the distance between two
neighboring rails.

SUMMARY OF THE INVENTION

It is an object of the present invention to simplify the loading and unloading approach. It is also an object of the present invention to increase the number of goods that can be processed during each surface treatment cycle.

- 5 This object is obtained by the device initially defined, which is characterised in that at least some of the openings comprise a first part arranged to receive the stopping member of the hanger while the hanger is threaded to the rails, and a second part arranged to keep the bent end of the hanger during the surface treatment process, and that the second part of the opening is arranged below
10 the first part of the opening seen from a gravitational point of view, in order to retain the hangers in a predetermined position within the second part.

By such improvement of the shape of the openings, it is possible to attach the hangers in the openings by threading the stopping member of the hanger
15 through the first part of the opening, and thereafter move the bent end part of the hanger, i.e. the part between the stopping member and the elongated element, to the second part of the opening. Since the hanger can be kept almost in a vertical position during the hanging procedure, the distance between the rails will be determined according to the size of the bent end, i.e.
20 the distance between the end of the stopping member and the elongated element of the hanger. Thus, the number of rails in each framework can be increased. Consequently, the number of hangers can be increased and thus the amount of goods processed simultaneously during each surface treatment cycle will be significantly increased. Also, since the hangers are goods-specific
25 and need to change frequently, switching the hangers will be easier and less time-consuming, and thus the time-saving is significant. Consequently, since the production cost for each processed piece of goods is reduced, both the efficiency and the production speed of the surface treatment process are highly improved.

30 Having the second part of the opening arranged below the first part of the opening, i.e. seen from a gravitational point of view, will facilitate the hanging procedure since the hanger will slide into the second part, to a predetermined position, more or less only with help of the gravity force.

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According to an embodiment of the invention, the first part of the opening is elongated, having a longitudinal axis, and extending away from the second part in an upward direction seen from a gravitational point of view. Thereby, if a vertical force pointing upwards should act on the hanger, the risk that the hanger should be displaced from its predetermined position, and unload itself from the rail, is considerably reduced. Also, in case the hanger should actually move from its predetermined position, in the second part of the opening, it will most likely return to the predetermined position with the help of gravity.

10 According to further embodiments of the invention, the device is used in a galvanization process, such as a hot-dip galvanization process.

The object of the invention is also obtained by the method initially defined, which is characterised by the steps defined in claim 5.

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BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present invention will become more apparent to a person skilled in the art from the following detailed description in conjunction with the appended drawing in which:

20

Fig. 1 shows a device for holding pieces of goods according to an embodiment of the invention.

25 Fig. 2a shows part of the rail, and a hanger, of the device shown in figure 1 in an enlarged view.

Fig. 2b is a perspective-view of figure 2a.

30 Fig. 2c is another perspective-view of figure 2a displaying the hanging approach of the hanger when inserted into the first part of the opening in the rail.

Fig 3a-d shows different designs of the openings arranged in the rail.

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DETAILED DESCRIPTION

Figure 1 shows a device 1 for holding pieces of goods according to an embodiment of the invention. The device 1 is arranged to be used in association with a surface treatment process and especially for the purpose of treating goods during a galvanization process or a hot-dip galvanization process.

The device 1 comprises a plurality of hangers 2 as seen in figure 1, each hanger 2 including an elongated element 3 having one end 4 arranged for the purpose of carrying goods and an opposite end that is bent and provided with a stopping member 5. The stopping member 5 is flat and has a width that is larger than the width of the elongated 3 element. The purpose of the stopping member 5 is to prevent the hanger 2 from falling off the rail 7 and also to retain the hanger 2 in a predetermined position. Further, the device 1 comprises a framework 6 including a plurality of rails 7, wherein each rail 7 is provided with a plurality of openings 8 adapted to receive the stopping member 5 of the hangers 2 and also to hold the hangers 2. The rails 7 are preferably arranged in parallel but also other configurations can be used. Lifting means 9 are being arranged for transporting the framework 6 between a raised (loading /unloading /transport) position and a lowered (treatment) position. The transporting operation is made with the help of a lifting device (not shown) such as a robot or an overhead travelling crane. At least one tank (not shown), holding a bath, is also arranged for the purpose of treating the hanging goods in the bath.

Figure 2a-b shows that the openings 8 arranged in the rails 71 comprises a first part 82 which is arranged to receive the stopping member 51 of the hanger 21 while the hanger 21 is threaded to the rail 71 and a second part 83 arranged to keep the bent end 84 of the hanger 21 during the surface treatment process.

Figure 2a-b shows a part of the device according to a preferred embodiment of the invention, where the first part 82 of the opening is elongated, having a longitudinal axis, and extending away from the second part 83 of the opening in an upward direction seen from a gravitational point of view. In order to be able to receive the stopping member 51 of the hanger, the first part 82 of the opening is arranged so that its length, seen in a longitudinal direction, is larger than the width of the stopping member 51 of the hanger 21, and also that its

width, seen in a vertical direction, is larger than the width of the elongated element 31 of the hanger 21.

The second part 83 of the opening is arranged below the first part 82 of the opening, seen from a gravitational point of view, in order to retain the hangers 21 in a predetermined position within the second part 83. The width, seen in a longitudinal direction, of the second part 83 is larger than the width of the elongated element 31 of the hanger but smaller than the width of the stopping member 51 of the hanger 21.

Figure 2c displays how the stopping member 51 of the hanger 21 in a first step is inserted into the first part 82 of the opening 81 in the rail 71. The hanger 21 is then moved from the first part 82 to the second part 83 of the opening 81. The first part 82 of the opening 81 is being connected to the second part 83 of the opening 81 which is being arranged below the first part 82 of the opening 81 seen from a gravitational point of view. Thereby the hanger 21 is prevented from being displaced from the predetermined position within the second part 83 of the opening 81.

Figure 3a displays an alternative solution on how to arrange the first part 91 of the opening so that the angle between a vertical line of the second part 92 of the opening and the longitudinal direction of the elongated opening of the first part 91 is close to 90 degrees. Thereby, the hanging approach of the hooks 93 is further improved.

Additional solutions on how to arrange some of the openings arranged in the rail are displayed in figure 3b-d.

The present invention is not limited to the embodiments disclosed but a person skilled in the art may modify it in a plurality of ways within the scope of the invention as defined by the claims.

CLAIMS

1. A device (1) for holding pieces of goods while being treated during a surface treatment process of the goods, wherein the device (1) comprises:

- a plurality of hangers (2), each hanger (2) including an elongated element (3) having one end (4) arranged for the purpose of carrying goods and an opposite end that is bent and provided with a stopping member (5) having a width that is larger than the width of the elongated element (3) , and

- a framework (6), including a plurality of rails (7), wherein each rail (7) is provided with a plurality of openings (8) adapted to receive the hangers (2) , **characterised** in that

at least some of said openings (8) comprise a first part (82) arranged to receive the stopping member (5) of the hanger (2) while the hanger (2) is threaded to the rails (7) and a second part (83) arranged to keep the bent end of the hanger during the galvanization process, and that the second part (83) of the opening is arranged below the first part (82) of the opening seen from a gravitational point of view, in order to retain the hangers (2) in a predetermined position within said second part.

2. A device according to claim 1, **characterised** in that said first part (82) is elongated, having a longitudinal axis, and extending away from the second part (83) in an upward direction seen from a gravitational point of view.

3. Use of a device according to claim 1, wherein said device (1) is used in a galvanization process.

4. Use of a device according to claim 3, wherein said device (1) is used in a hot-dip galvanization process.

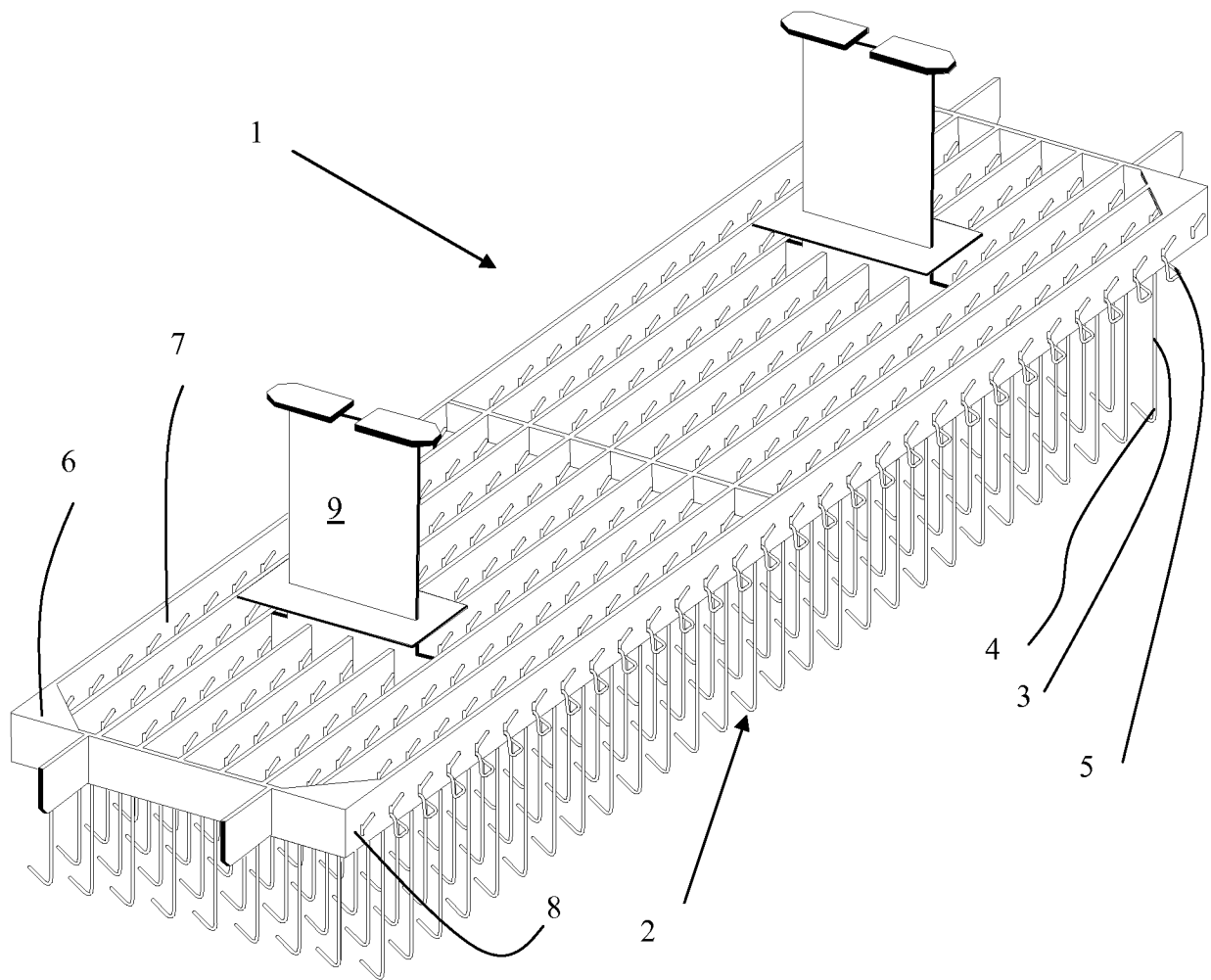
5. A method for loading hangers (2) on a device (1) according to claim 1-2, **characterised by:**

- inserting the stopping member (5) of a hanger (2) into the first part

(2) of said opening,

- moving the hanger (2) to the second part (83) of the opening, and
- retaining the hanger (2) within said second part (83) of the opening in a predetermined position.

Fig. 1



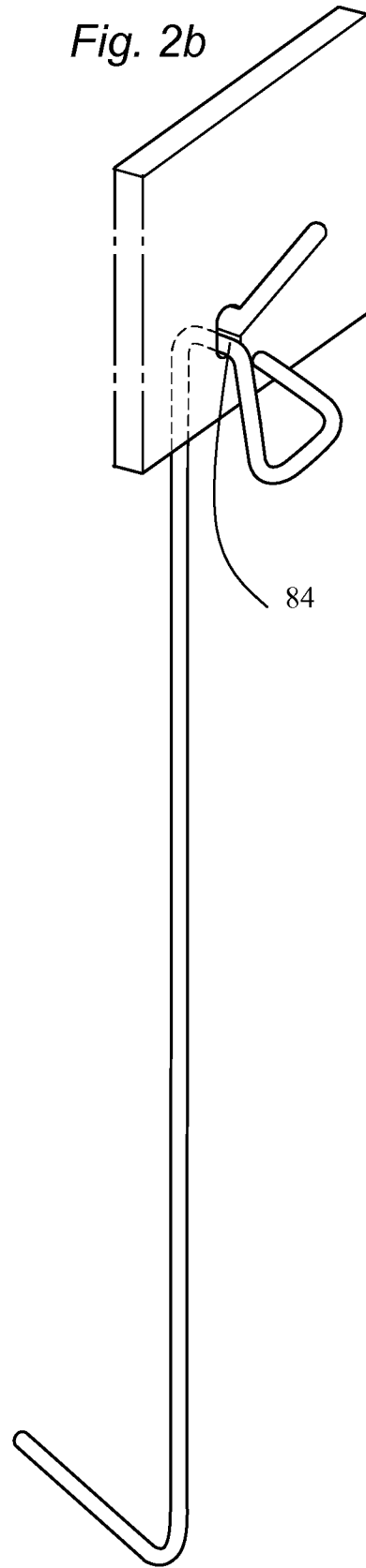
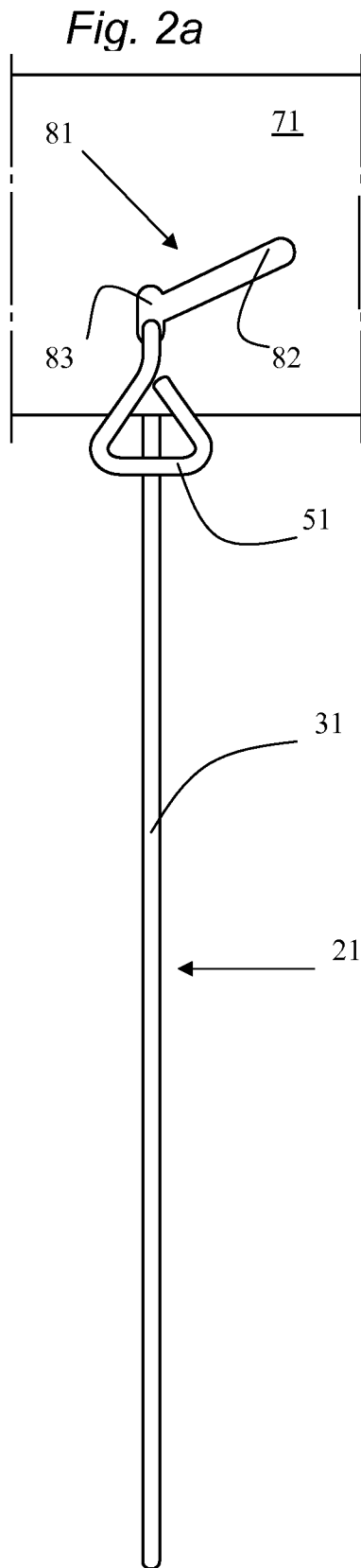
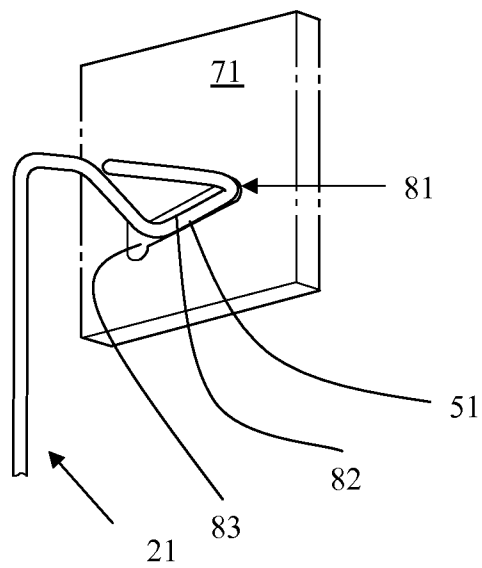


Fig. 2c



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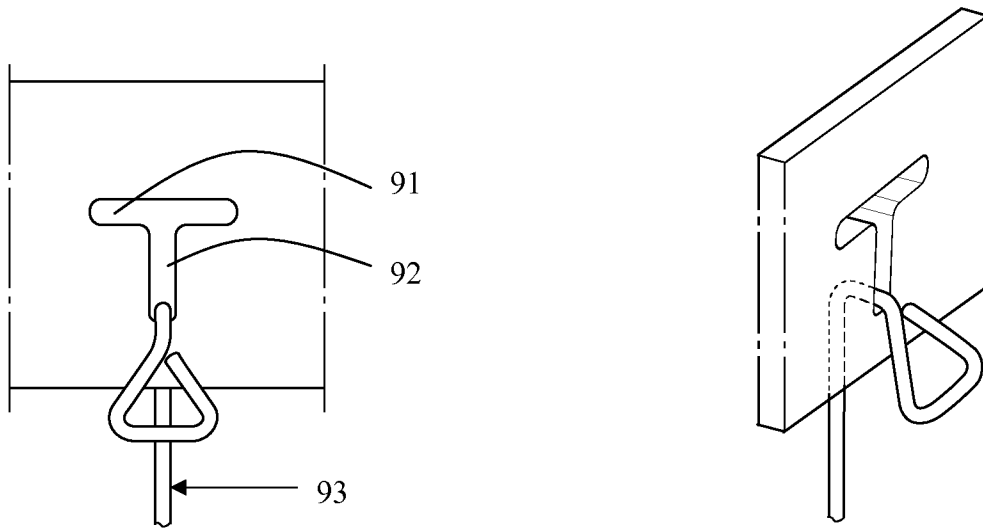


Fig. 3a

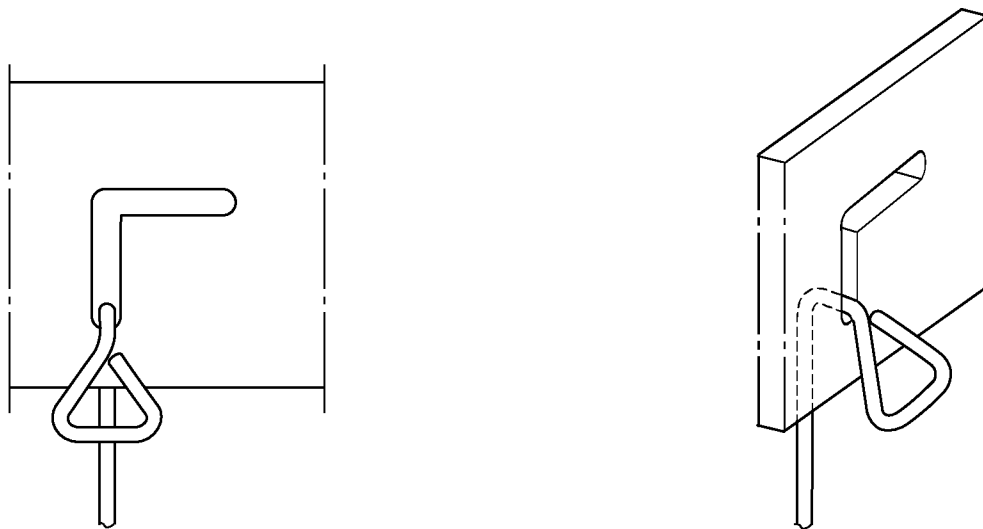


Fig. 3b

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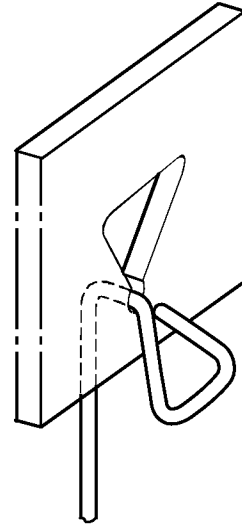
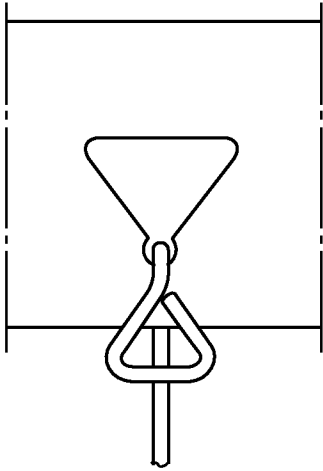


Fig. 3c

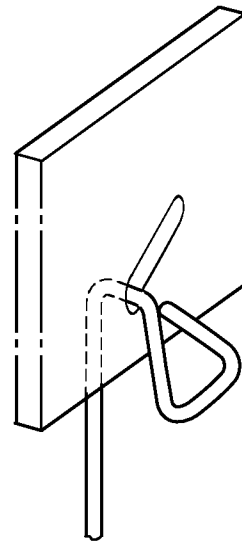
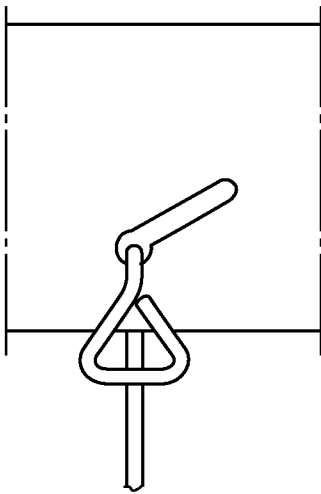


Fig. 3d

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/057193

A. CLASSIFICATION OF SUBJECT MATTER

INV. C23C2/00 C23C2/34 B65G49/00 B65G49/04 C25D17/06
B05B5/08

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)

C23C B65G C25D B05B

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 908 120 A (YATES DONNIE MITCHELL [US]) 1 June 1999 (1999-06-01)	1-2,5
A	column 5, line 12 - column 6, line 10; figures 1,2,6,7, 8, 9a-9c column 5, line 13 - column 6, line 10; claims 4,6	3-4
X	US 4 037 727 A (KUNKLE KENNETH W) 26 July 1977 (1977-07-26)	1-2,5
Y	column 2, line 30 - column 3, line 40; figures 1-3,8-9	3-4
Y	US 5 951 765 A (NAUJOKAT HELMUT [DE]) 14 September 1999 (1999-09-14)	3-4
	column 2, line 47 - column 3, line 35; claims 1-5; figures 1-2	
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2009/057193

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 217 853 A (DAVITZ WALTER E [US]) 19 August 1980 (1980-08-19) column 3, line 24 - column 5, line 10; figures 1,3,4, 7-9 -----	1-5
A	US 5 088 609 A (FRYC OLDRICH [US]) 18 February 1992 (1992-02-18) column 2, line 52 - column 4, line 52; figures 1-6 -----	1-5
A	US 5 147 050 A (CULLEN LAWRENCE E [US]) 15 September 1992 (1992-09-15) abstract; figures 1,2,4,7, 8, 10 -----	1-5

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2009/057193

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5908120	A	01-06-1999	NONE	
US 4037727	A	26-07-1977	NONE	
US 5951765	A	14-09-1999	DE 29621475 U1 EP 0848074 A1	06-02-1997 17-06-1998
US 4217853	A	19-08-1980	NONE	
US 5088609	A	18-02-1992	NONE	
US 5147050	A	15-09-1992	NONE	