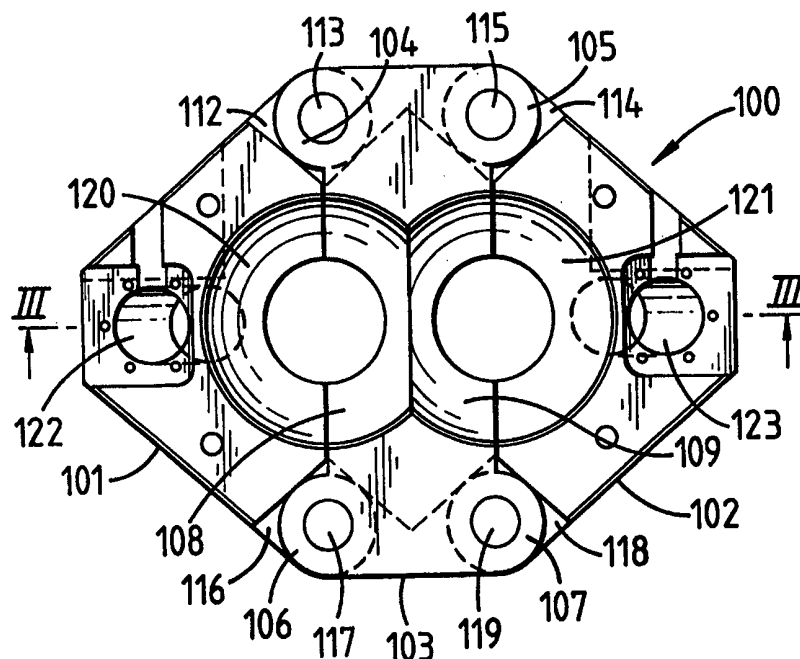




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(54) Title: AN APPARATUS FOR RETAINING TWO STRINGS OF TUBULARS



(57) Abstract

An apparatus for retaining two strings of tubulars characterised in that said apparatus comprises body parts (1, 2; 101, 102) of a device for retaining a single string of tubulars and a converting member (103; 305). A device for retaining a string of tubulars, said device comprising at least one body part (203) having a curved tapered surface (202) upon which inserts are located for engagement with said string of tubulars characterised in that said curved tapered surface comprises a recess for the passage of cables.

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AN APPARATUS FOR RETAINING TWO STRINGS OF TUBULARS

The invention relates to an apparatus for retaining two strings of tubulars, and is particularly but not exclusively for use as a spider in the platform of an oil rig and also for use in an elevator of an oil rig. The invention also relates to a device for retaining a string of tubulars the device comprising at least one body part having a curved tapered surface upon which inserts are located for engagement with the string of tubulars.

In the formation and operation of oil or gas wells it is desirable to lower a string of tubulars into the well. For this purpose, a retaining device is used in a platform of the rig, known as a spider, and a corresponding retaining device in an elevator of the rig. The string of tubulars is initially retained from falling down the well by the spider. Additional stands of tubulars are moved from a rack to a position above the spider. The stand of tubulars is connected to the string. The device in the elevator is placed around the top of the lengthened string of tubulars. The spider is then released from engagement with the string, and the device in the elevator now takes the full weight of the lengthened string of tubulars. The elevator moves downwardly towards the spider, lowering the lengthened string of tubulars. The spider engages the lengthened string of tubulars and the elevator is subsequently released from engagement therewith. This process is reversed for pulling a string of tubulars out of a well.

It is often desired to lower two substantially parallel strings of tubulars simultaneously, such as a delivery pipe and an injection pipe used in the forced extraction of oil or gas from a well or used in trial wells.

A problem associated with prior art devices is that

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their construction is large, expensive and can only be used for retaining two strings of tubular.

Accordingly there is provided an apparatus for retaining two strings of tubulars characterised in that
5 said apparatus comprises body parts of a device for retaining a single string of tubulars and a converting member.

Other features and aspects of the present invention are set out in claims 2 to 9.

10 There is also provided a device for retaining a string of tubulars, said device comprising at least one body part having a curved tapered surface upon which inserts are located for engagement with said string of tubulars characterised in that said curved tapered
15 surface comprises a recess for the passage of cables.

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For a better understanding of the present invention, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 is a top plan view of a prior art device
5 for retaining a single string of tubulars;

Figure 2 is a top plan view of an apparatus for retaining two strings of tubulars, the apparatus being in accordance with a first aspect of the invention;

Figure 3 is a cross sectional view of the apparatus
10 of Figure 2 taken along the line III-III;

Figure 4 is a top plan view of part of the apparatus of Figure 2;

Figure 5 is a cross sectional view of the part of the apparatus of Figure 4 taken along the line V-V;

Figure 6 is a cross sectional view of the part of
15 the apparatus of Figure 4 taken along the line VI-VI;

Figure 7 is a top plan view of an apparatus for retaining a single string of tubulars, the apparatus being in accordance with a second aspect of the
20 invention;

Figure 8 is a top plan view of an alternative apparatus for retaining two strings of tubulars, the apparatus being in accordance with the first and second aspects of the invention;

Figure 9 is a cross sectional view of the apparatus
25 of Figure 8 taken along the line IX-IX.

Referring to Figure 1 there is shown a prior art device for retaining a single string of tubulars. The device comprises two body parts 1 and 2. The body parts 1
30 and 2 are generally triangular in shape and are hinged in relation to one another by means of inter engaging rows of eyelets 3 and 4 and a hinge pin 5 at one corner thereof. Each row of eyelets 3 and 4 is integral with the respective body part 1 and 2. The body parts 1 and 2 also
35 have inter engaging rows of eyelets 6 and 7 on the

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opposite corners thereof. The body parts 1 and 2 may be locked together by use of a locking pin 8 insertable through the rows of eyelets 6 and 7.

5 The body parts 1 and 2 are provided with
semicircular tapered surfaces 9 and 10 which taper
downwardly from a first diameter 11 to a second smaller
diameter 12. In use, corresponding tapered inserts (not
shown) are provided on the tapered surface for gripping
10 the tubular which runs therethrough. The weight of the
tubular string will be transferred from the tapered
inserts to the tapered surfaces 9 and 10.

A gap 13 is provided between the body parts 1 and 2.
Body part 1 also comprises an opening 14 which runs from
the top to the bottom of the body part 1 and lies
15 parallel to the tapered surface 9. The opening 14 is
provided for receiving an actuating piston and cylinder
(not shown) which, in use, moves the tapered inserts
along the tapered surfaces 9 and 10 for engaging or
disengaging the inserts with a tubular. The actuating
20 piston and cylinder may be hydraulic or pneumatic.

In use, two such devices are used. One device is
mounted in an elevator and the other is mounted in the
floor of an oil rig. A string of tubulars, such as
casing, is first retained in the device mounted in the
25 floor of the oil rig. A section of casing may then be
added or taken away from the string of casing thereabove.
This may be achieved by using tubular handling equipment
to move the section of casing to a position above the
string of casing, and a tong to facilitate connection or
30 disconnection of the section of casing to or from the
string of casing. The device mounted in the elevator may
now be used to retain the section of casing extending
above the device in the floor of the oil rig. The device
in the floor of the oil rig may now be disengaged from
35 the string of tubulars. The elevator is then operated to

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lower or raise the entire string of casing. The device in the rig floor is then used to retain the string of casing once again.

5 Referring to Figures 2 to 6 there is shown an apparatus for retaining two strings of tubulars, the apparatus being in accordance with the invention. The apparatus is generally identified by the reference numeral 100.

10 The apparatus 100 comprises body part 101 which is generally similar to body part 1 of Figure 1, body part 102 which is a mirror image of the body part 1 of Figure 1 and a converting member 103.

15 The converting member 103 is generally rectangular in shape with rows of eyelets 104, 105, 106, 107 at each corner thereof. The converting member is provided with two semicircular tapered surfaces 108, 109 which taper downwardly from a first diameter 110 to a smaller diameter 111. The semicircular tapered surfaces 108, 109 oppose each other and merge as the diameter increases
20 from the smaller diameter to the first diameter as shown in Figure 6. In use, corresponding tapered inserts (not shown) are provided on the tapered surfaces 108, 109 for gripping a tubular.

25 The converting member 103 is arranged between the body parts 101 and 102 and are hinged thereto. A row of eyelets 112 is integral with one corner of the body part 101 and inter engages with the row of eyelets 104 of the converting member 103 and a hinge pin 113 is located therethrough. A row of eyelets 114 is integral with a
30 first corner of the body part 102 and inter engages with the row of eyelets 105 of the converting member 103 and a hinge pin 115 is located therethrough. A row of eyelets 116 is integral with an opposing corner of body part 101 and inter engages with a row of eyelets 106 of the
35 converting member 103 and a locking pin 117 may be

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inserted therethrough to lock the body part 101 to the converting member 103. A row of eyelets 118 is integral with an opposing corner of body part 102 and inter engages with the row of eyelets 107 of the converting member 103 and a locking pin 119 may be inserted therethrough to lock the body part 102 to the converting member 103.

Each of the body parts 101 and 102 are provided with corresponding tapered surfaces 120 and 121 and with openings 122 and 123 for receiving actuating pistons and cylinders as described with reference to the device of Figure 1.

In use, two such apparatuses are used, one as a spider in the platform of an oil rig and the other in the elevator of the oil rig. The method of operation is much the same as that described with reference to the device of Figure 1, except that two actuating pistons and cylinders are used to move the tapered inserts along the tapered surfaces 108,109,120 and 121 for engaging or disengaging the inserts with a tubular.

Referring now to Figure 7 there is shown a device, generally identified by reference numeral 200.

The device 200 is generally similar to the device shown in Figure 1 with the additional feature of a recess 201 in the tapered surface 202 of the body part 203. The recess 201 is sized to accommodate a loom of cables running substantially parallel to the string of tubulars. This enables the cable strings to pass through the device for retaining a string of tubulars, for example, through a spider.

Figures 8 and 9 shows an apparatus generally identified by reference numeral 300.

The device 300 is generally similar to the apparatus 100 of Figure 2 with the additional feature of a recess 301 and 302 in each of the tapered surface 303 and 304 of

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the converting member 305. The recesses 301 and 302 are sized to accommodate a loom of cables running substantially parallel to the two strings of tubulars. This enables the cable strings to pass through the device
5 for retaining a string of tubulars, for example, through a spider.

It is envisaged that the apparatuses could be used for coiled tubing, as well as tool strings, strings of drill pipe, casing and liners.

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Claims:

1. An apparatus for retaining two strings of tubulars characterised in that said apparatus comprises body parts (1,2;101,102) of a device for retaining a single string
5 of tubulars and a converting member (103;305).
2. An apparatus as claimed in Claim 1 characterised in that said apparatus comprises two of said body parts (1,2;101,102) which together encircle said single string of tubulars and wherein said converting member (103;305)
10 is located between said two body parts.
3. An apparatus as claimed in Claim 1 or 2 characterised in that said body parts (1,2;101,102) and said converting member (103;305) comprise hinge components (3,4,5;104,105,112-5) and are hinged
15 therebetween.
4. An apparatus as claimed in Claim 1, 2 or 3 characterised in that said body parts (1,2;101,102) and said converting member (103;305) comprise locking components (6,7,8;106,107,116-9) for secure fastening
20 therebetween.
5. An apparatus as claimed in any of Claims 2 to 4 characterised in that said body parts (1,2;101,102) and said converting member (103;305) have substantially semicircular surfaces (108,109,120,121;303,304) which
25 taper downwardly upon which inserts are located for engagement with said strings of tubulars.
6. An apparatus as claimed in Claim 5 characterised in that said body parts (1,2;101,102) comprise openings (122,123) for an actuator for moving said insert along
30 said tapered surface.
7. An apparatus as claimed in Claim 5 or 6 characterised in that said converting member (103) comprises two semicircular surfaces (108,109) which merge along said taper.
- 35 8. An apparatus as claimed in any of Claims 5 to 7

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characterised in that said semicircular surfaces (108,109,120,121) comprises a recess (301,302) for the passage of cables.

9. A converting member of any preceding Claim.

- 5 10. A device for retaining a string of tubulars, said device comprising at least one body part (203) having a curved tapered surface (202) upon which inserts are located for engagement with said string of tubulars characterised in that said curved tapered surface
- 10 comprises a recess for the passage of cables.

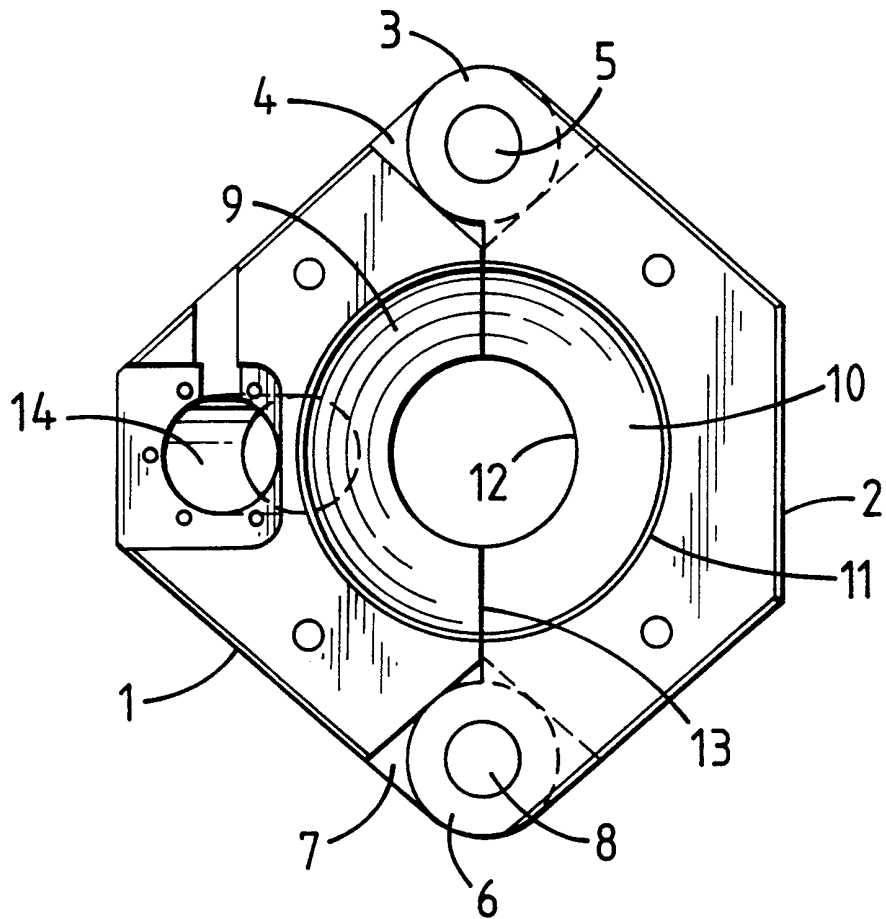
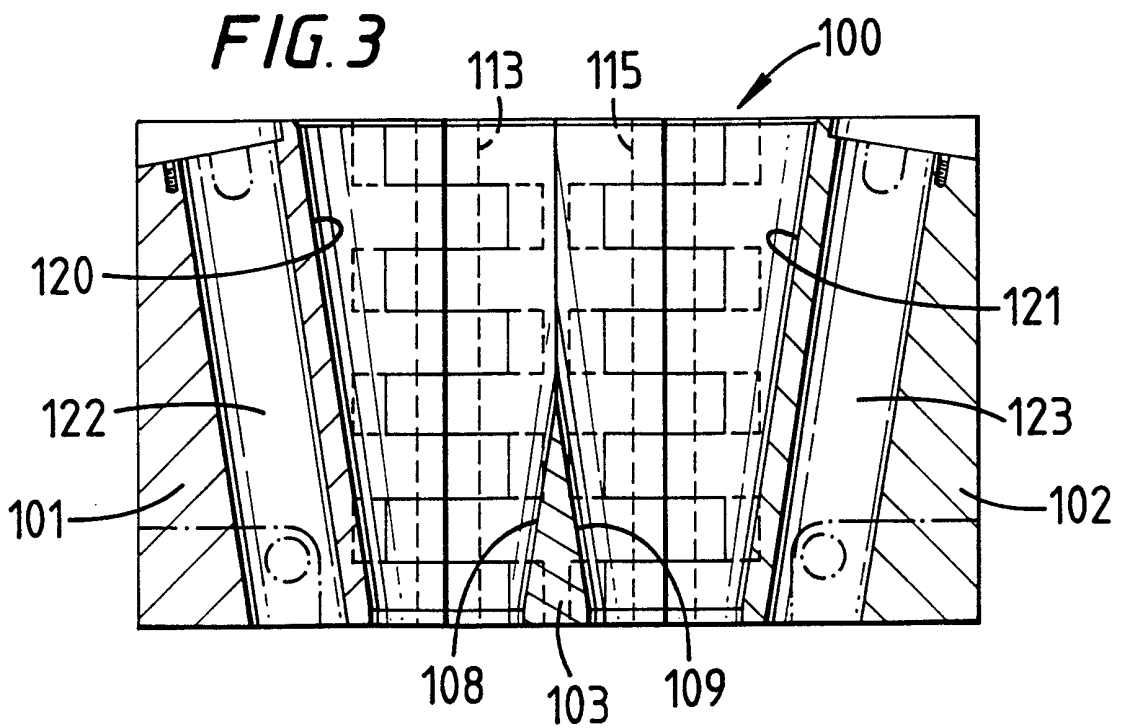
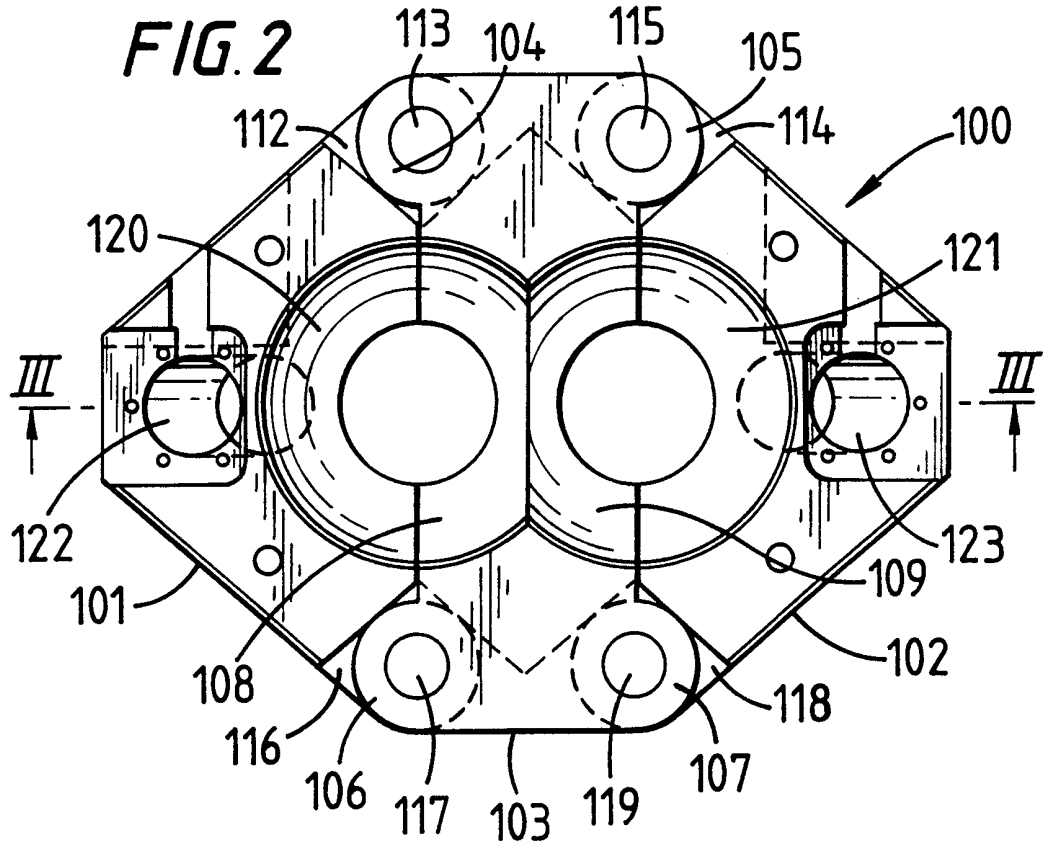
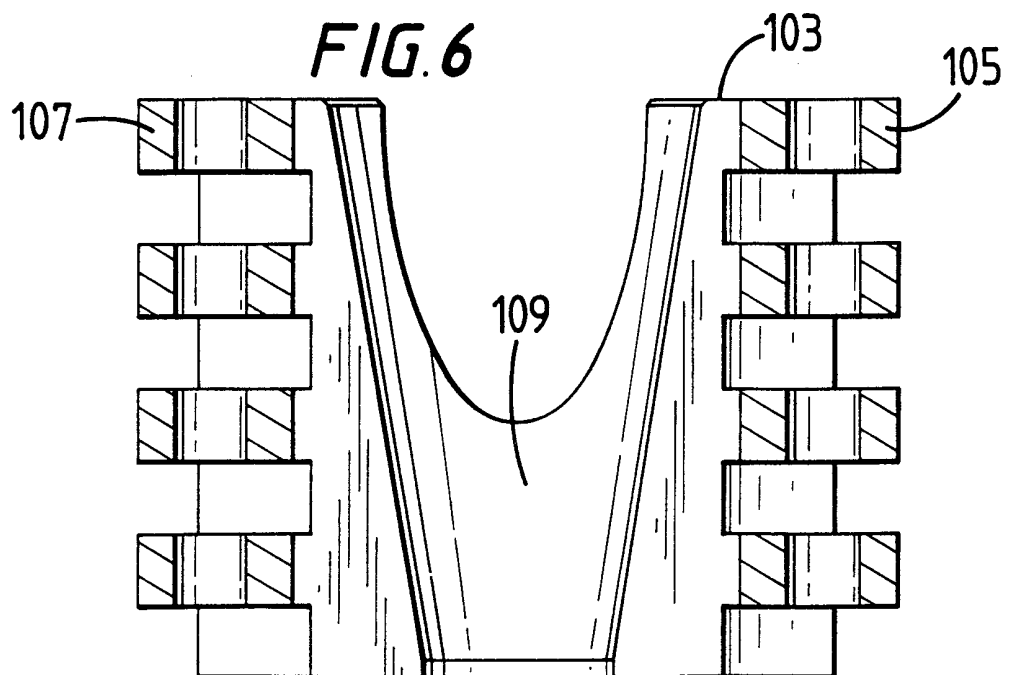
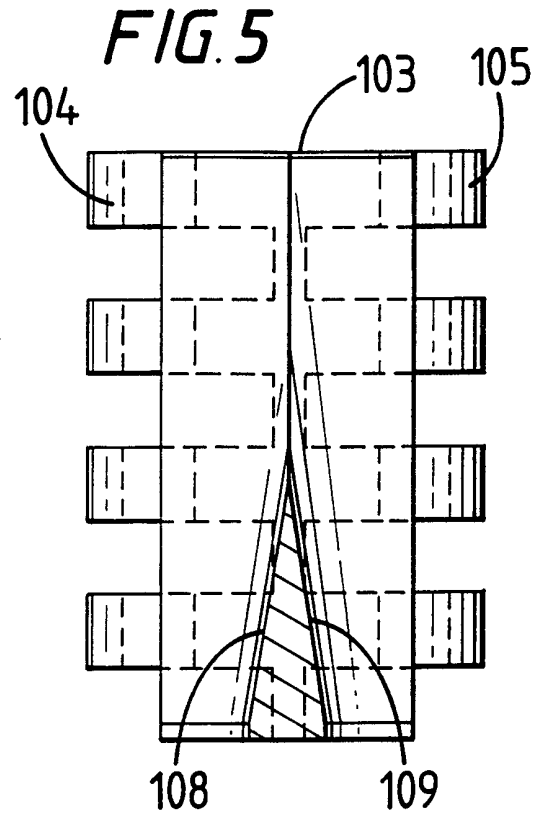
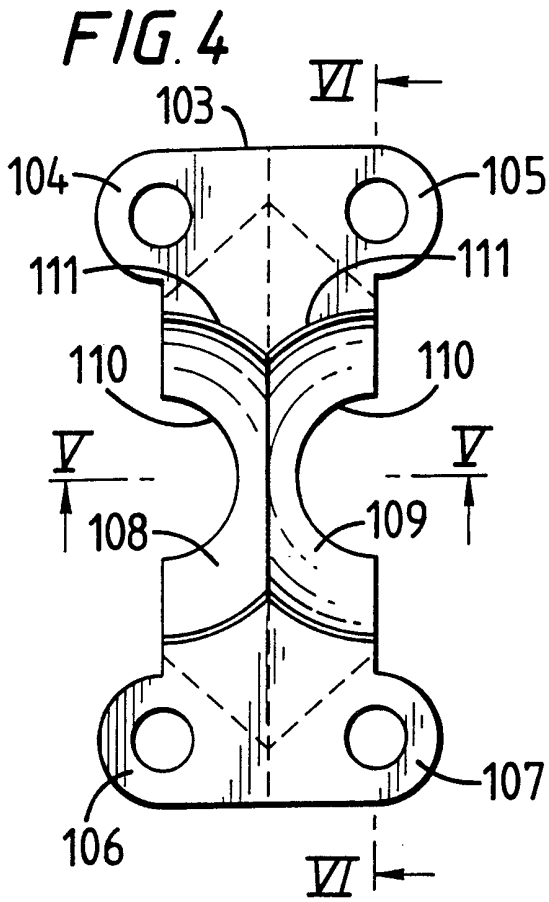


FIG. 1





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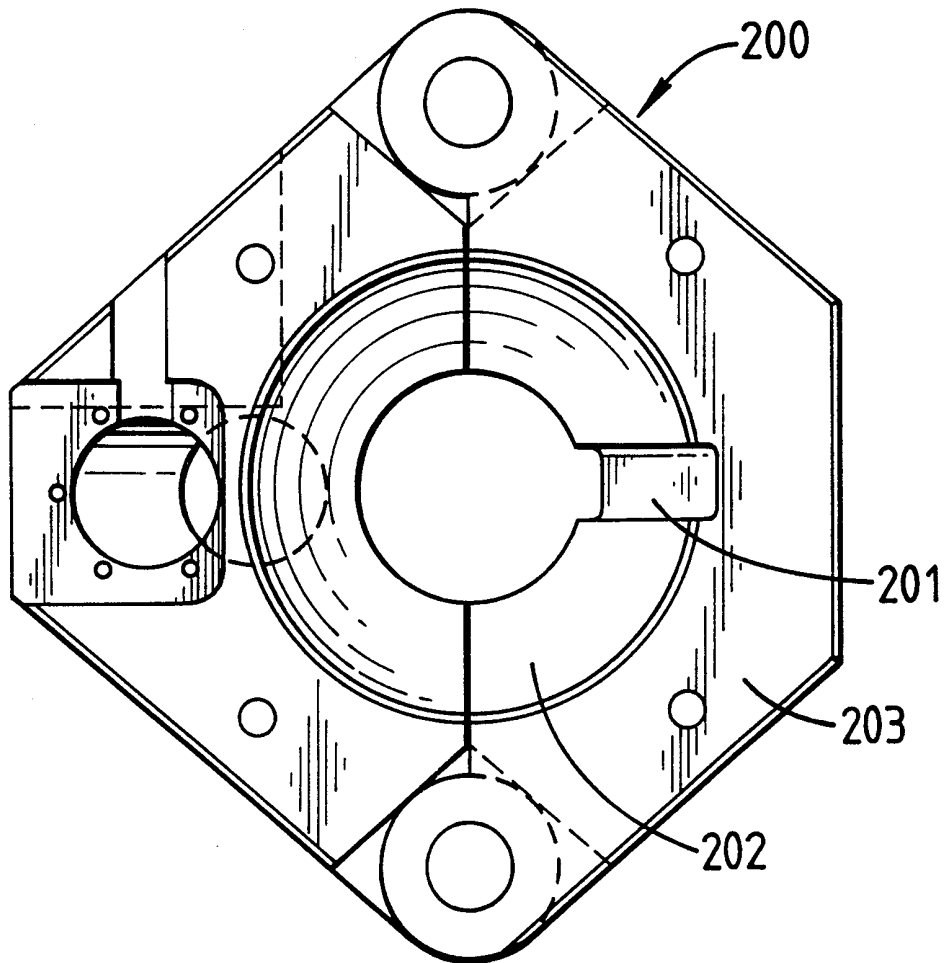
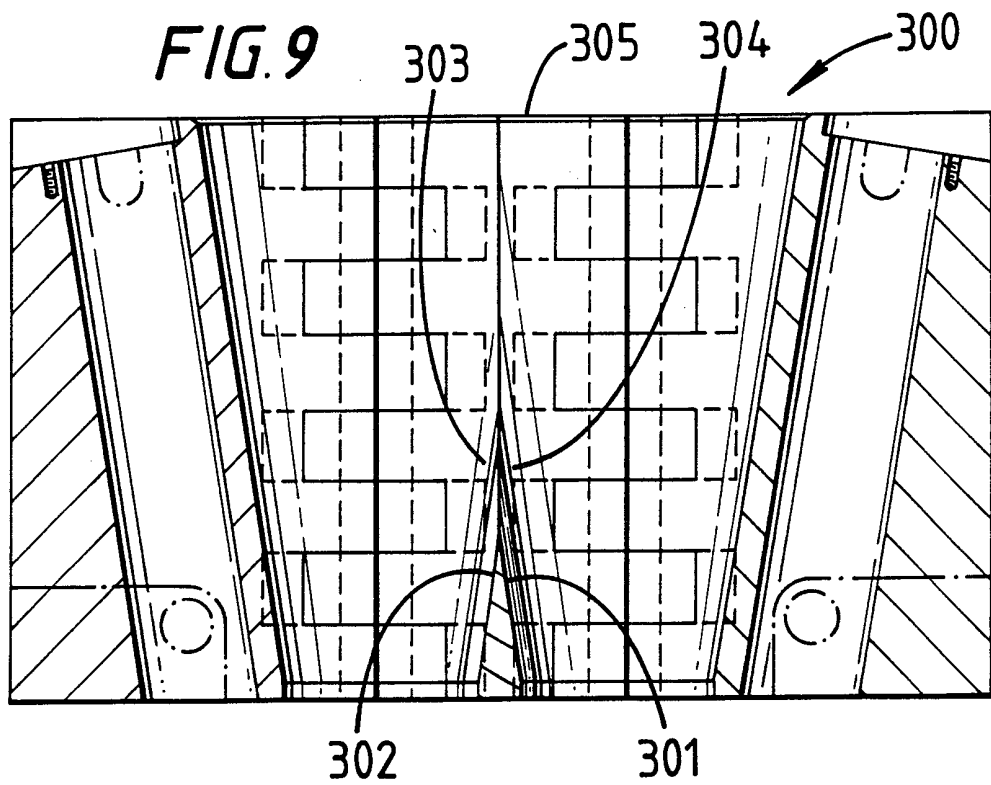
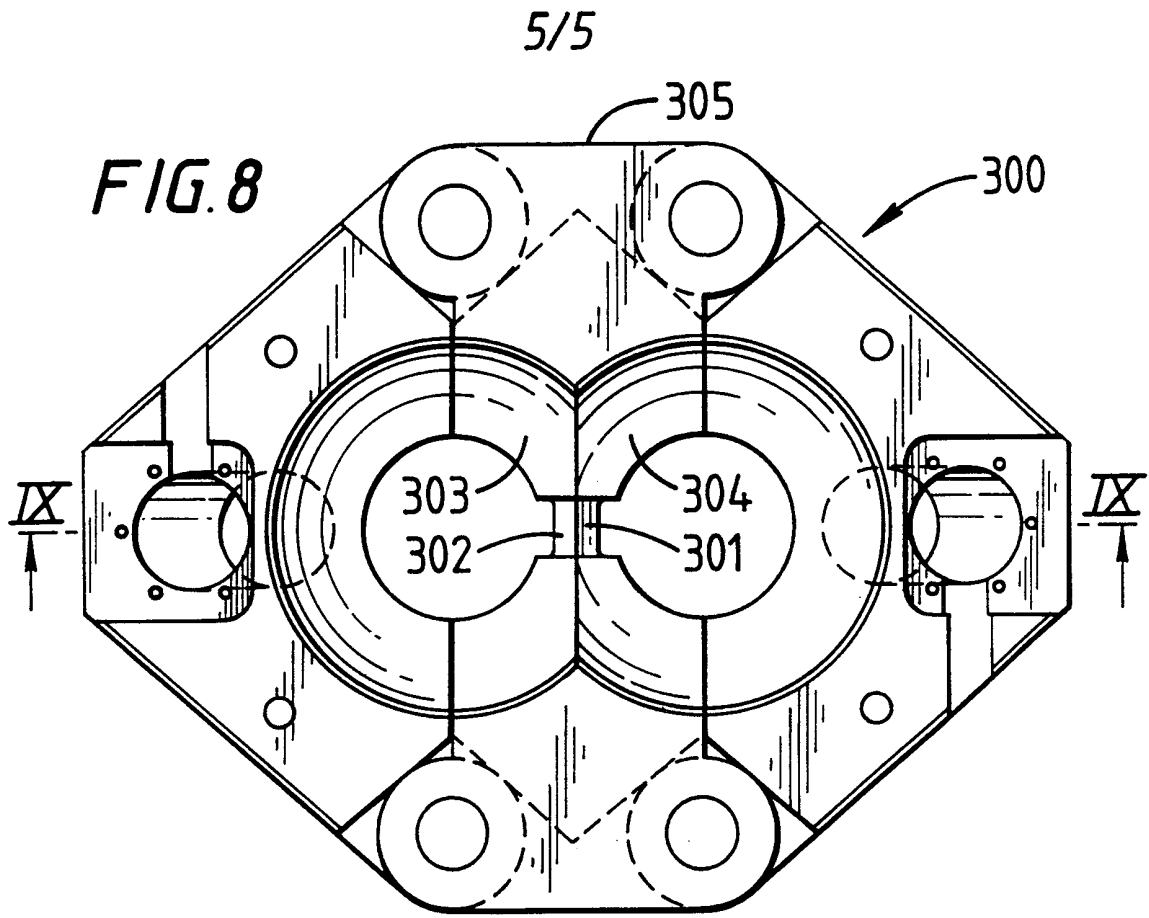


FIG. 7



INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/03198

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 E21B19/10 E21B19/07 E21B33/04 E21B33/047 E21B19/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

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IPC 6 E21B

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 287 776 A (C.C. BROWN) 29 November 1966 see column 1, line 68 - column 3, line 14 see column 2, line 39-54 see figures 1-4	1, 10
A	US 2 298 507 A (A.J. PENNICK) 13 October 1942 see figures 1,2	1, 10
A	US 2 934 148 A (F.B. ALLAIRE) 26 April 1960 see figure 5	1, 10
A	US 3 188 708 A (H.W. O'HAVER) 15 June 1965 see the whole document	1, 10
	-/--	



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Patent family members are listed in annex.

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Date of the actual completion of the international search

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International Application No

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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 3 330 354 A (E.C. CHAMBLEE) 11 July 1967 see the whole document ---	1,10
A	US 4 354 706 A (COYLE SR WILLIAM E) 19 October 1982 see figures 1,3 ---	1,10
A	FR 2 658 972 A (ELF AQUITAINE) 30 August 1991 see figure 1 ---	8,10
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