(19) Europäisches Patentamt
European Patent Office
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(11) **EP 3 165 339 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.05.2017 Bulletin 2017/19

(51) Int Cl.:
B27B 27/04 *(2006.01)*

(21) Application number: **16191693.7**

(22) Date of filing: **30.09.2016**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **05.11.2015 GB 201519538**

(71) Applicant: **Black & Decker Inc.**
New Britain, CT 06053 (US)

(72) Inventors:
- **Bettacchini, Marcello**
  06073 Ellera di Corciano (IT)
- **Ginocchini, Lucio**
  06132 San Sisto (IT)
- **Mortaro, Matteo**
  06055 Marsciano (IT)

(74) Representative: **Bell, Ian Stephen et al**
Black & Decker
Patent Department
210 Bath Road
Slough
Berkshire SL1 3YD (GB)

(54) MITRE SAW WITH FIXED FENCE

(57) A saw comprising: a base structure (6, 100) having a work surface (102, 104); a cutting unit (50) mounted on the base structure (6, 100) which is capable of cutting a work piece when a work piece is located on the work surface (102, 104); a fixed fence (16) non moveably mounted on the base structure (6, 100) which traverses a part of the work surface (102, 104) and which is used to support a work piece when it is being cut; characterised in that there is at least one rib (160) mounted on the base structure (6, 100), the fixed fence (16) abutting against the at least rib (160) in a direction of a force applied to the fixed fence (16) by a work piece when it is being cut. The base structure of the saw can comprise: a base (6) having two platforms (12), each platform (12) having an upper surface (104); a table (100) rotatably mounted within the base between the two platforms (12), the table having an upper surface 102; wherein the upper surfaces (104) of the platforms (12) and the upper surface (102) of the table are co-planer to form the work surface; wherein the cutting unit (50) is pivotally mounted on the table (100) and is capable of pivoting towards or away from the work surface (102, 104); wherein the fixed fence is non moveably mounted on each of the platforms and traverses the upper surface of the table; wherein each platform comprises a rib 160, the fixed fence (16) abutting against each rib (160) on each platform (12) in a direction of a force applied to the fixed fence (16) by a work piece when it is being cut.

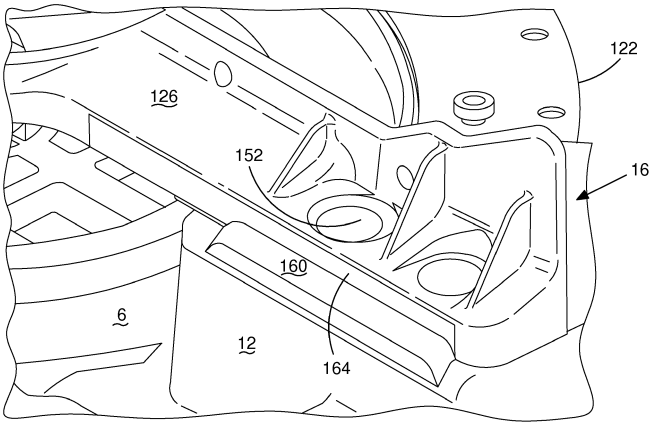

FIG.4

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Description

[0001] The present invention relates to a saw having a fixed fence for supporting a work piece.

[0002] Numerous types of saw comprise a base structure upon which a work piece is located in order for it to be cut. For example, on chop saws, mitre saws, bevel saws, sliding saws and compound mitre saws, the work piece is held stationary on the base whilst the saw blade is moved towards or across the base structure in order to cut the work piece located on it. On other types of saw, for example, a table saw or band saw, the work piece is slid across the base structure in order for it to engage with a cutting blade having an overall stationary position. In all of these types of saw, the position of the work piece is controlled by a fence which is attached to the base structure. Some fences are permanently fixed in a non-moveable manner to the base and are referred to as a "fixed fence". Others are mounted in a moveable manner on the base structure so that their position can be adjusted and are known as a "moveable fence".

[0003] The present invention relates to a fixed fence and the mechanism by which it is mounted to a base structure.

[0004] Accordingly, there is provided a saw in accordance with claim 1.

[0005] An embodiment of the present invention will now be described with reference to accompanying drawings of which:

Figure 1 shows a perspective view of a mitre saw;

Figure 2 shows a rear view of the base and fixed fence only according to the first embodiment of the present invention;

Figure 3 shows a front exploded view of the base and fixed fence;

Figure 4 shows a rear view of part of the base and fixed fence; and

Figure 5 shows a schematic diagram of a vertical cross section of part of a side portion of the fence with a recess according to a second embodiment of the present invention;

Figure 6 shows a rear view of the fence according to a third embodiment of the present invention;

Figure 7 shows a vertical cross section of a bolt which attaches the fence as shown in Figure 6; and

Figure 8 shows a schematic diagram of an exploded view of the bolt and the aperture through the side portion of the fence as shown in Figure 7.

[0006] Referring to Figure 1, the mitre saw comprises a base structure 6, 100 comprising a base 6 and a rotatable table 100. The base 6 has two platforms 12 formed symmetrically on either side of the base 6. Rotatably mounted on the base 6 between the two platforms 12 is the rotatable table 100, the top surface 102 of which lies flush with the top surfaces 104 of the two platforms 12. The combined surfaces 102, 104 of the platforms 12 and rotatable table 100 form a work surface. An extension arm 106 is rigidly attached to the rotatable table 100 which extends forward in well-known manner. The rotatable table 100 and extension arm 106 can pivot about a vertical axis through a range of angular positions, the angular movement being restricted by the extension arm 106 engaging with one or other of the sides 108 of the platforms 12. A locking lever 120 can be used to lock the rotatable table 100 and extension arm 106 in desired angular positions. A scale 122 is attached to the base 6 to indicate the angular position of the extension arm 106. Carrying handles 10 are attached to the sides of the base 6.

[0007] Pivotally mounted on the rear of the rotatable table 100 is a mount 27. Two guide rods (not shown) are pivotally attached to the mount 27. Slideably mounted on the two guide rods is a cutting unit 50 which comprises a motor housing 68 in which is mounted an electric motor (not shown), guide rod support housing 110 in which are slideably mounted the two guide rods, and a blade guard 112 which surrounds a cutting blade 124 which is mounted on an output spindle (not shown) of the motor. The mount 27 can pivot about a horizontal axis on the rotatable table to enable the saw to perform bevel cuts. The rods pivot on the mount about a horizontal axis to move the two rods and the cutting unit 50 vertically away from or towards the rotatable table 100 and extension arm 106 to enable the saw to perform chop cuts. A spring (not shown) biases the mount 27 and guide rods to their highest position. A handle 114 is attached to the front of the cutting unit 50 by which a user moves the cutting unit 50 towards or away from the rotatable table 100 and extension arm 106. The mount 27 automatically locks in its uppermost pivotal position by a latch mechanism (not shown). A pivotal lever 116 is mounted on the handle 114 by which an operator can release the latch mechanism. A switch 118 is also mounted on the handle 114, the depression of which activates the electric motor.

[0008] Rigidly attached on top of the two platforms 12 of the base 6 at the rear of the platforms 12 is a fixed fence 16. The fence 16 extends across the rotatable table 100 but does not interfere with its rotational movement.

[0009] Referring to Figures 2 to 4, the fixed fence 16 comprises two side portions 126, having flat faces 18 the planes of which are flush with each other, which attach to the platforms 12 and extend towards and partly over the rotatable table 100 and which are connected by a semi-circular portion 128 in well-known manner. The side portions 126 and semi-circular portion 128 are manufactured in a one piece construction. When the fixed fence 16 is mounted on the platforms 12, the vertical axis of

rotation of the rotatable table 100 is located in the plane of the faces 18 of the side portions 126. The centre of the semi-circular portion 128 aligns with the vertical axis of the rotatable table 100.

[0010] A threaded aperture 150 is formed in the top of each platform 12. An aperture 152 is formed through the rear of each side portion 126. When the fixed fence 16 is mounted on the platforms 12, each of the two apertures 152 aligns with a threaded aperture 150. A threaded bolt 154 is passed through each of the two apertures 152 and screwed into a threaded aperture 150 to secure the fixed fence 16 to the base 6.

[0011] During the use of the saw, a work piece is placed on the work surface 102, 104 and is placed against the flush surfaces of the side portions 126 of the fixed fence. After activating the motor to rotate the cutting blade 124, the cutting unit 50 is pivoted towards the work piece to engage the rotating cutting blade with the work piece. As the cutting blade 124 cuts the work piece, it presses the work piece against the fixed fence 16 in a direction perpendicular to the plane of the flush surfaces of the side portions 126 of the fixed fence 16. The work piece in turn applies a force against the fixed fence 16 in the same direction. The cutting blade 124 cuts the work piece whilst it is pressed against the fixed fence 16.

[0012] The first embodiment of the present invention will now be described.

[0013] Formed on the rear of each platform is an elongate rib 160 which extends vertically upwards from the top surfaces 104 of the platforms 12 at the rear of the platforms. When the fixed fence 16 is mounted on the base, the ribs 160 locate against the rear wall 164 of the side portions 126 to locate the fence 16 in the correct position and prevent rearward movement whilst the fixed fence is being attached to the base 6 and provide addition support against rearward movement of the fence 16 when the fixed fence 16 is being used.

[0014] A second embodiment of the present invention will now be described with reference to Figure 5. Where the same features are present in the second embodiment which were present in the first embodiment, the same reference numbers have been used.

[0015] The second embodiment comprises elongate ribs 160 which are of the same design as in the first embodiment. However, in addition, formed in each of the rear walls 160 of the side portions 126 of the fixed fence 16 is a recess 162 which are open rearwardly (direction A, parallel to the work surface) as well as downwardly (direction B, perpendicularly to the work surface). The size of the recesses 162 correspond to the size of the ribs 160. When the fixed fence 16 is mounted on the base 6, the ribs 160 locate in and engage with the recesses 162 to locate the fixed fence 16 in the correct position whilst it is being assembled and provide additional support against rearward movement when the fixed fence 16 is being used. As the recesses 162 are open rearwardly, the fixed fence 16 can be moved forward slightly during assembly to accommodate manufacturing tolerances.

[0016] It will be appreciated by a person skilled in the art that the recesses 162 can be replaced with grooves which only open downwardly.

[0017] A third embodiment of the present invention will now be described with reference to Figure 6 to 8. Where the same features are present in the second embodiment which were present in the first embodiment, the same reference numbers have been used.

[0018] The difference between the third embodiment and the first embodiment is the design of the bolts 154 and the apertures 152 formed through the rear of each side portion 126 of the fixed fence 16.

[0019] Each bolt comprises a tapered head 300 which is attached to a threaded body 302. The tapered head 300 comprises an angled side wall 304. Each aperture 152 comprises a frusto conical entrance 306 connected to a tubular section 308. The frusto conical entrance 306 comprises an angled wall 310. The dimensions of the angled wall 304 of the tapered head 300 and the angled wall 310 of the frusto conical entrance 306 are the same. When the fence 16 is attached to the base 6, the threaded body 302 of the bolt 154 is passed through the aperture 152 to threadedly engage the threaded aperture 150. The bolt 154 is then rotated, resulting the threaded body 302 of the bolt 154 screwing into the threaded aperture 150, the bolt 154 moving in the direction of Arrow P as it does so. As the bolt 154 screws into the threaded aperture 150, the angled side wall 304 of the tapered head 300 engages with the angled wall 310 of the frusto conical entrance 306. As the bolt 154 continues to screw into the threaded aperture 150, the angled side wall 304 of the tapered head 300 and the angled wall 310 of the frusto conical entrance 306 act as a cam and cam follower and slide along each other in order to move into alignment to allow the bolt 154 to continue to move in the direction of Arrow P. As the angled side wall 304 of the tapered head 300 aligns with the angled wall 310 of the frusto conical entrance 306, the side portion 126 of the fixed fence 16 is urged in the direction of Arrow Q into engagement with the rib 160. As the bolt 154 is tightened, the side portion 126 of the fixed fence 16 is pushed against rib 160. When the bolt 154 is screwed to its maximum amount into the threaded aperture 150, the side portion 126 of the fixed fence 16 is held firmly against the rib 160.

[0020] Whilst the present invention has been described in relation to a sliding compound mitre saw, it will be appreciate that it is applicable to any saw which uses a fixed fence to support a work piece on a base such as a chop saw, a bevel saw, a table saw, a band saw, a slide saw or a radial arm saw.

Claims

1. A saw comprising:

a base structure (6, 100) having a work surface

(102, 104);
a cutting unit (50) mounted on the base structure (6, 100) which is capable of cutting a work piece when a work piece is located on the work surface (102, 104);
a fixed fence (16) mounted on the base structure (6, 100) which traverses a part of the work surface (102, 104) and which is used to support a work piece when it is being cut;
characterised in that there is at least one rib (160) mounted on the base structure (6, 100), the fixed fence (16) abutting against the at least one rib (160).

2. A saw as claimed in claim 1 wherein the fixed fence (16) abuts against the at least one rib (160) in a direction of a force applied to the fixed fence (16) by a work piece when it is being cut.

3. A saw as claimed in either of claims 1 or 2 wherein the base structure comprises:

a base (6) having two platforms (12), each platform (12) having an upper surface (104);
a table (100) rotatably mounted within the base between the two platforms (12), the table having an upper surface 102;
wherein the upper surfaces (104) of the platforms (12) and the upper surface (102) of the table are co-planer to form the work surface;
wherein the cutting unit (50) is pivotally mounted on the table (100) and is capable of pivoting towards or away from the work surface (102, 104);
wherein the fixed fence is mounted on each of the platforms and traverses the upper surface of the table,
wherein each platform comprises a rib 160, the fixed fence (16) abutting against each rib (160) on each platform (12) in a direction of a force applied to the fixed fence (16) by a work piece when it is being cut.

4. A saw as claimed in claim 3 wherein each of the ribs (160) is integrally formed with its platform 12.

5. A saw as claimed in any of the previous claims wherein the fixed fence comprises at least one recess (162) or groove in which the at least one rib (160) locates when the fixed fence (16) is attached to the base structure (6, 100).

6. A saw as claimed in claim 5 wherein the recess is open in both a rearward direction and a downward direction.

7. A saw as claimed in any of the previous claims wherein the fixed fence (16) is mounted on the base structure (6, 100) by a fastener (154) attached to the fence (16) which is inserted into the base assembly (6, 100) to attach the fastener to the base assembly wherein the fastener applies a biasing force to the fence which urges the fence into engagement with the rib (160) as the fastener is inserted into the base assembly.

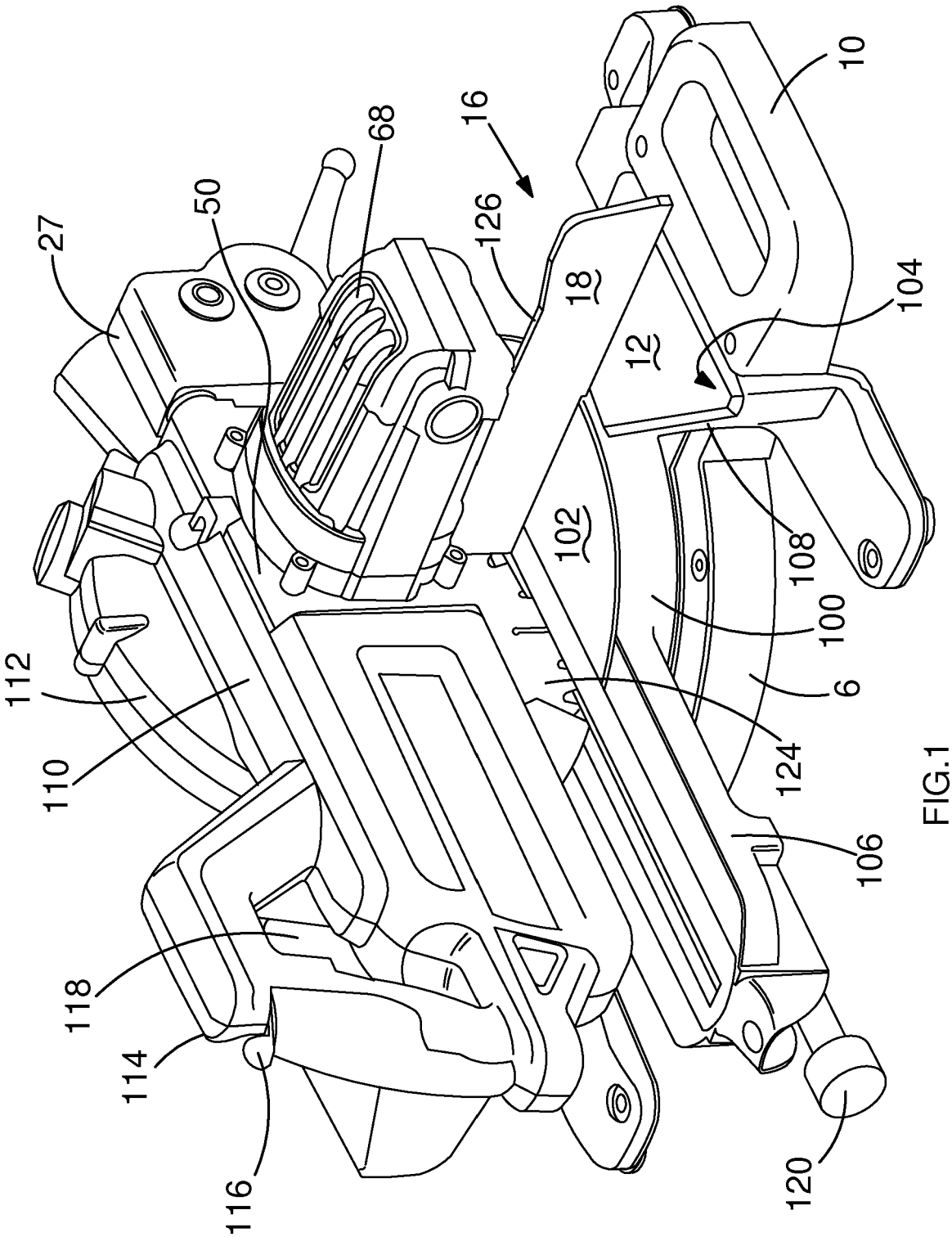
8. A saw as claimed in claim 7 wherein the fastener extends through an aperture (152) formed through the fence.

9. A saw as claimed in claim 8 wherein the fastener extends through and beyond the aperture (152) formed through the fence, the part (302) of the fastener (154) which extends beyond the aperture being capable of being inserted into the base assembly.

10. A saw as claimed in either of claims 8 or 9 wherein the fastener comprises an angle wall (304) which engages with and slides along an angled wall (310) formed within the aperture (152) as the fastener is inserted into the base assembly in order to apply the biasing force to the fence to urge the fence into engagement with the rib.

11. A saw as claimed in claim 10 wherein the fastener is a bolt (154) comprising a tapered head (300) and a threaded body (302), the angled wall (304) being the side wall of the tapered head, a part of the threaded body extending beyond the aperture;
wherein the aperture comprises a frusto concial entrance (306), the angled wall (310) being the side wall of the frusto conical entrance;
wherein the fastener is inserted into the base assembly by a part of the threaded body being screwed into a threaded aperture (150) formed in the base assembly;
wherein, as the threaded body is screwed into the threaded aperture, the side wall of the tapered head engages with and slides along the side wall of the frusto conical entrance in order to move the tapered head into alignment with the frusto conical entrance, the sliding movement applying the biasing force on the fence to urge the fence into engagement with the rib.

12. A saw as claimed in claim 11 wherein the part of the threaded body which extends beyond the aperture screws into the threaded aperture (150) formed in the base assembly.


10
16
68
50
27
126
18
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114
116
120

FIG.1

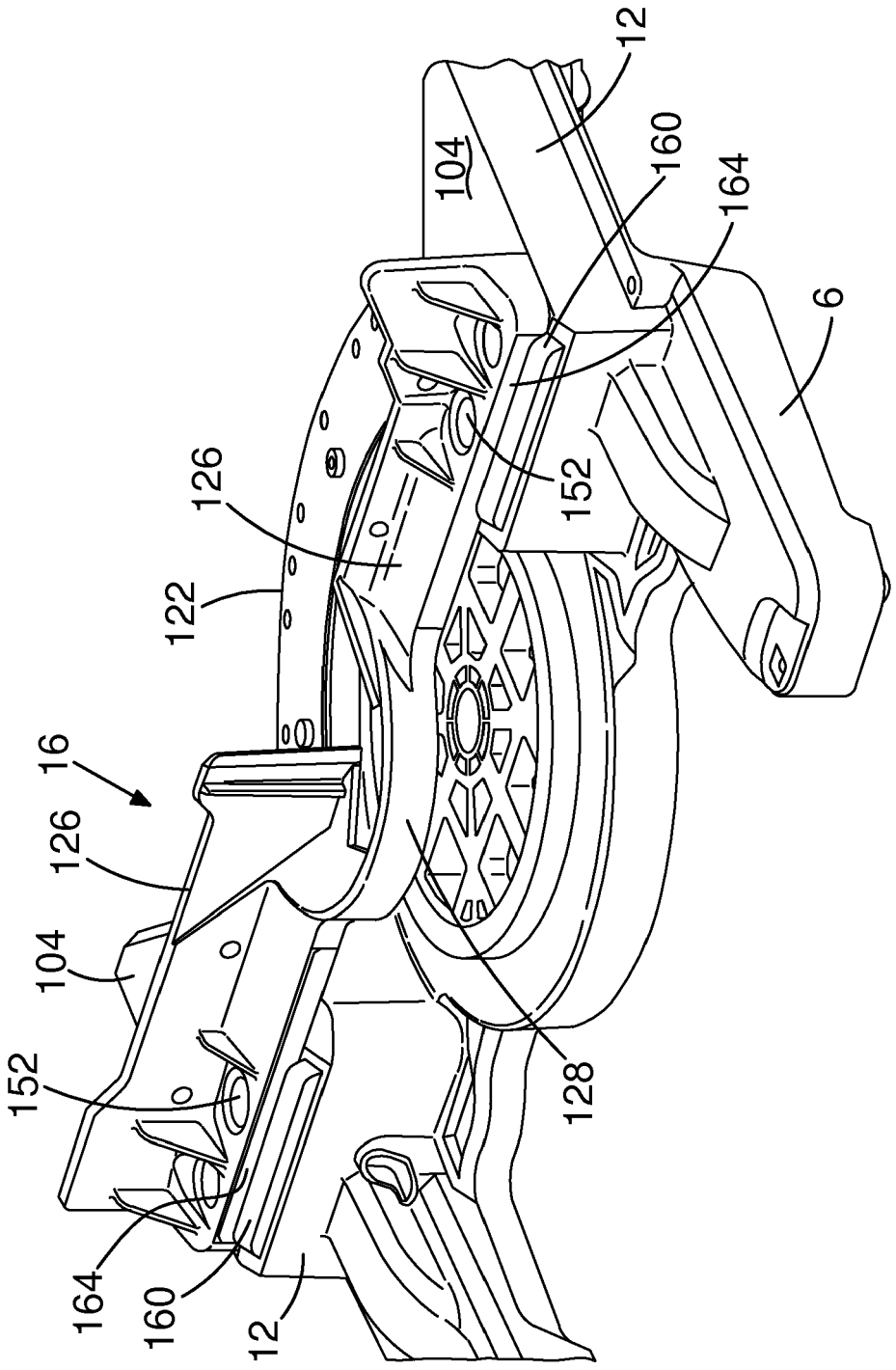

FIG.2

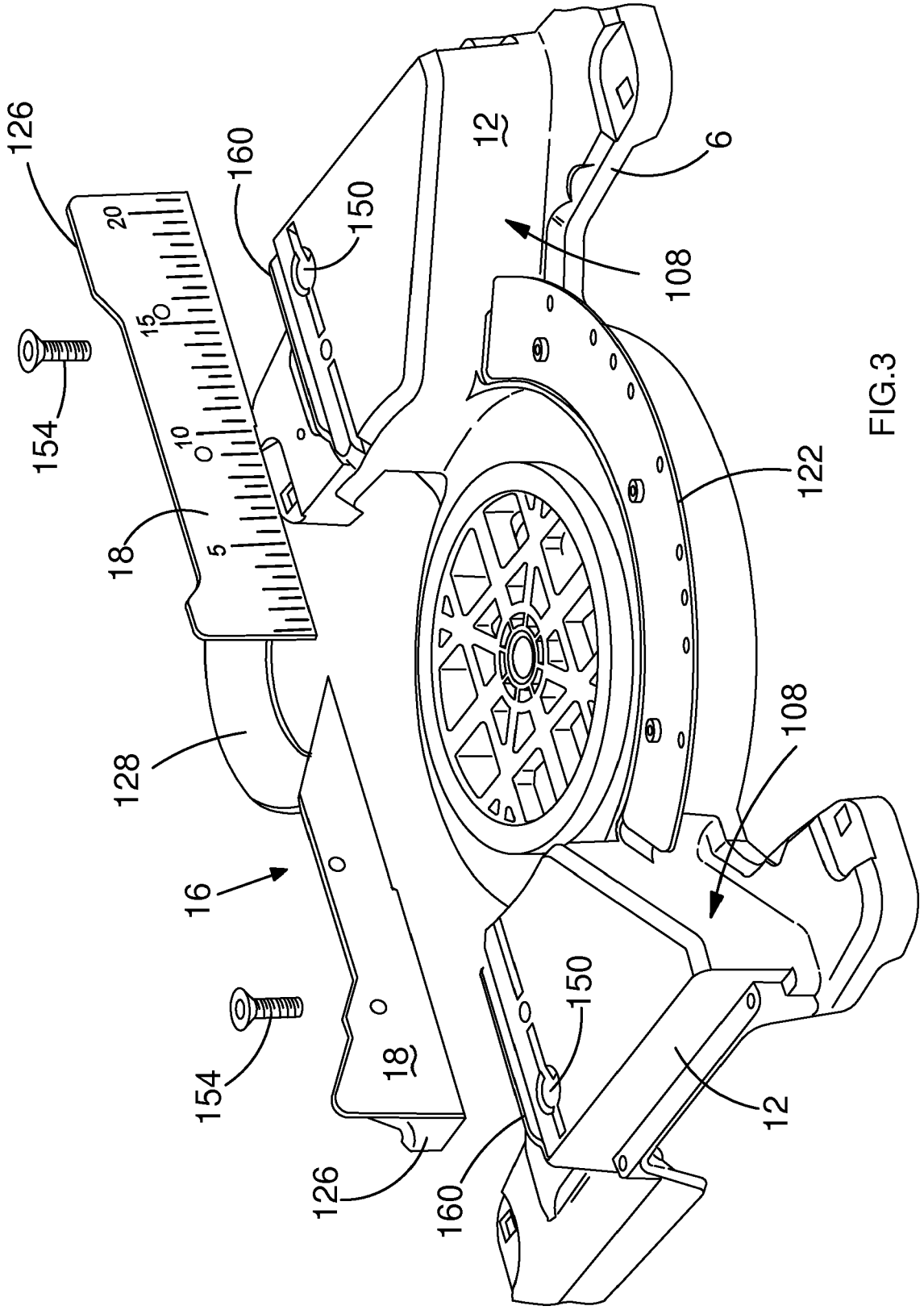

FIG.3

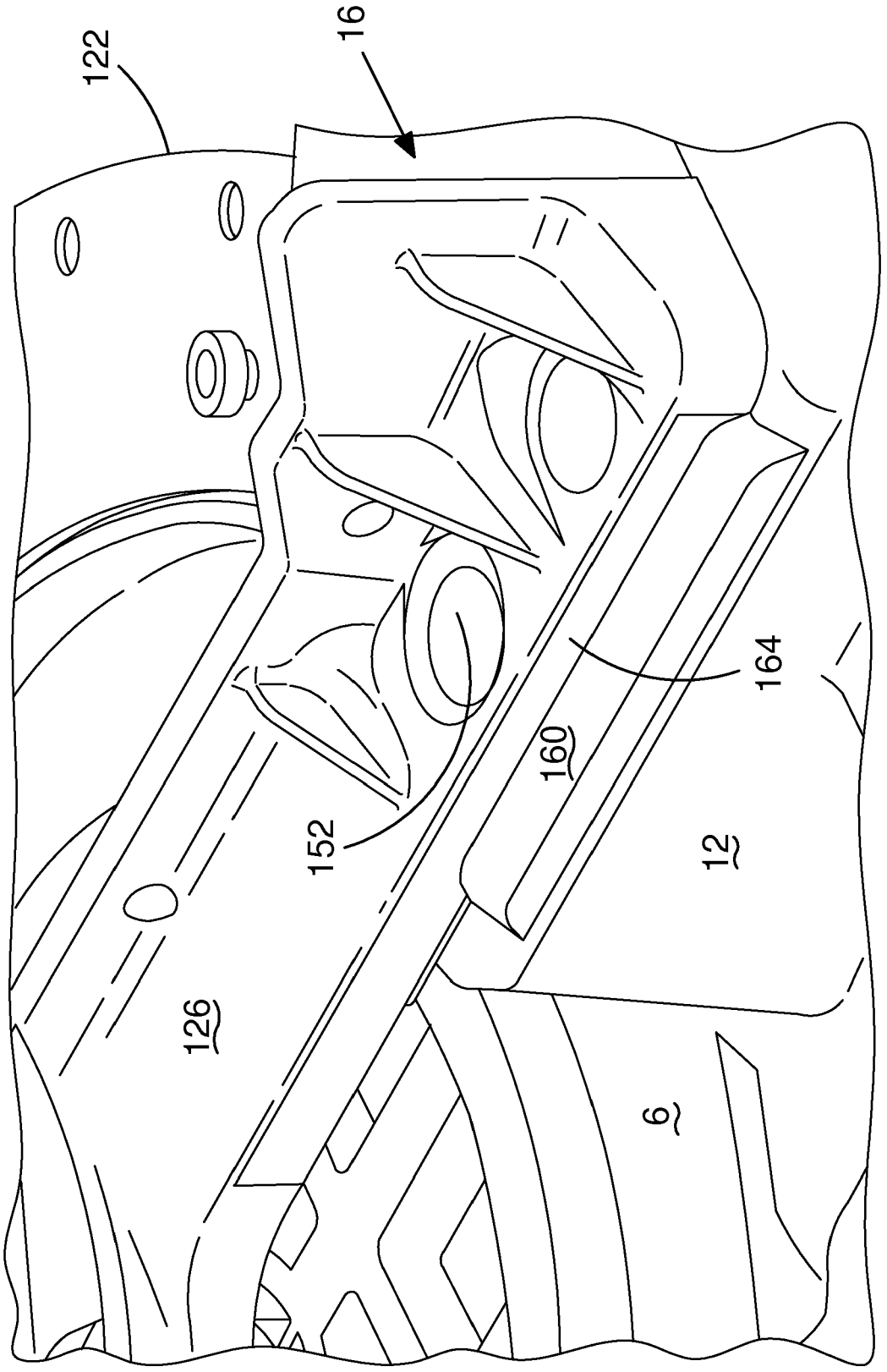

FIG.4

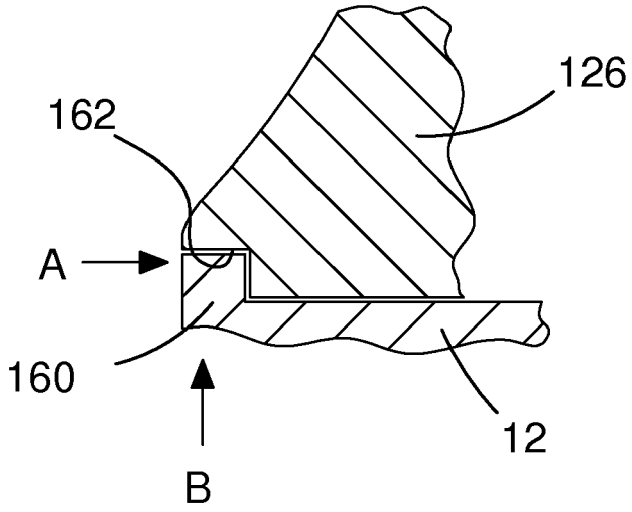

FIG.5

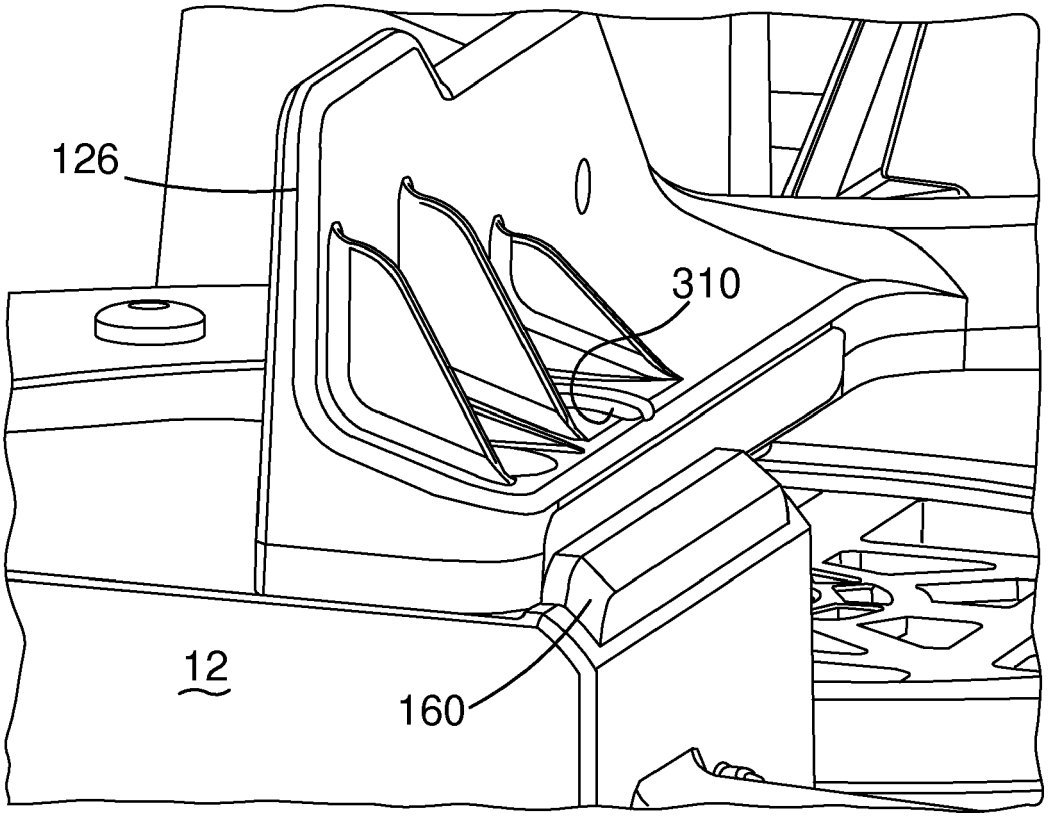

FIG.6

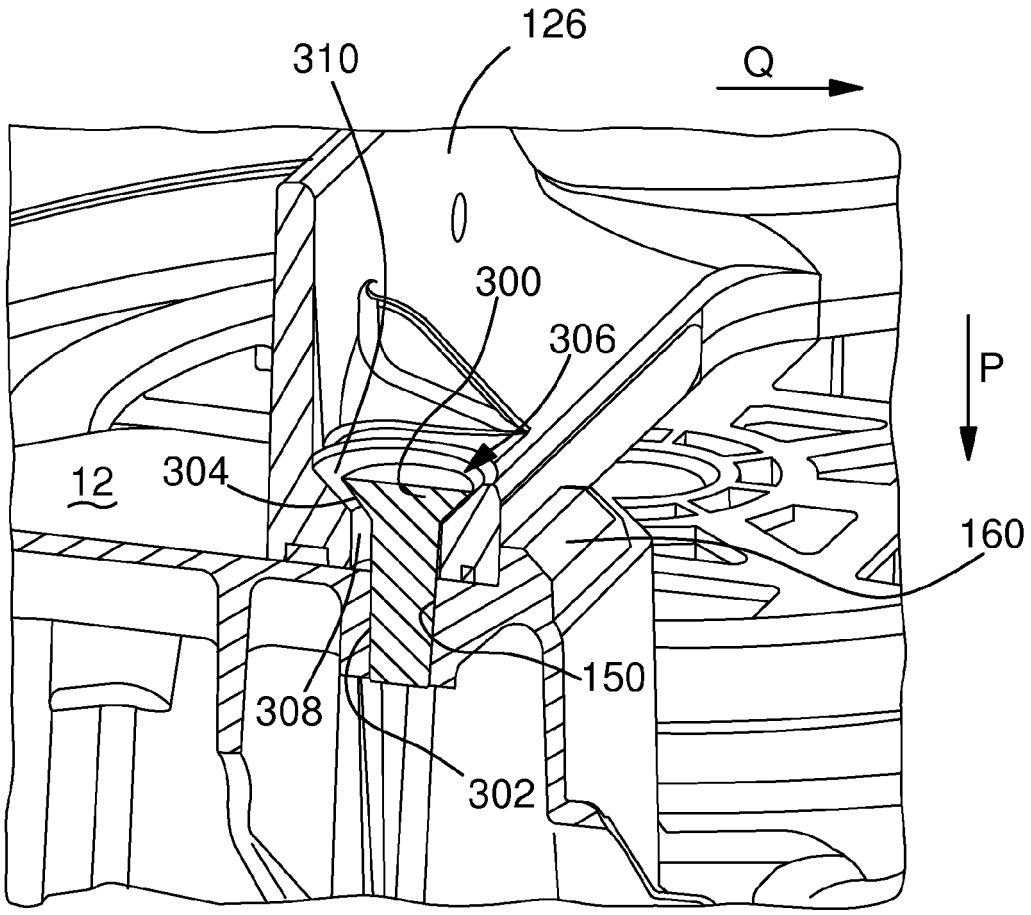
126
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FIG.7

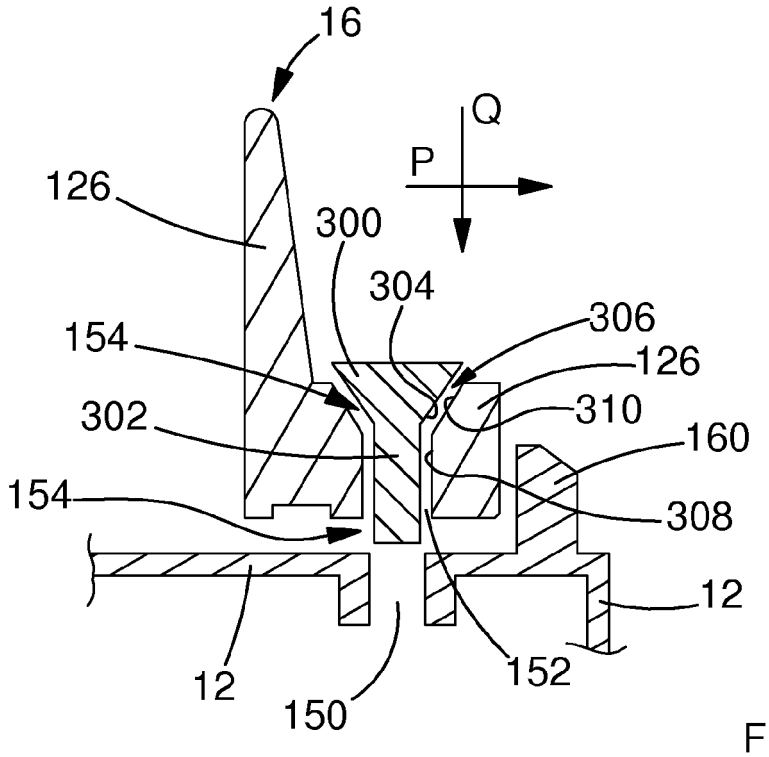
16
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FIG.8

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EUROPEAN SEARCH REPORT

Application Number
EP 16 19 1693

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 865 079 A (ITZOV ANDREW L [US]) 2 February 1999 (1999-02-02) * column 3, line 29 - line 49; column 4, line 13 - line 15 and line 35 - line 38; figures 1, 8 *	1-12	INV. B27B27/04
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TECHNICAL FIELDS SEARCHED (IPC)

B27B
B23D
B27G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	14 February 2017	D'Andrea, Angela

CATEGORY OF CITED DOCUMENTS

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