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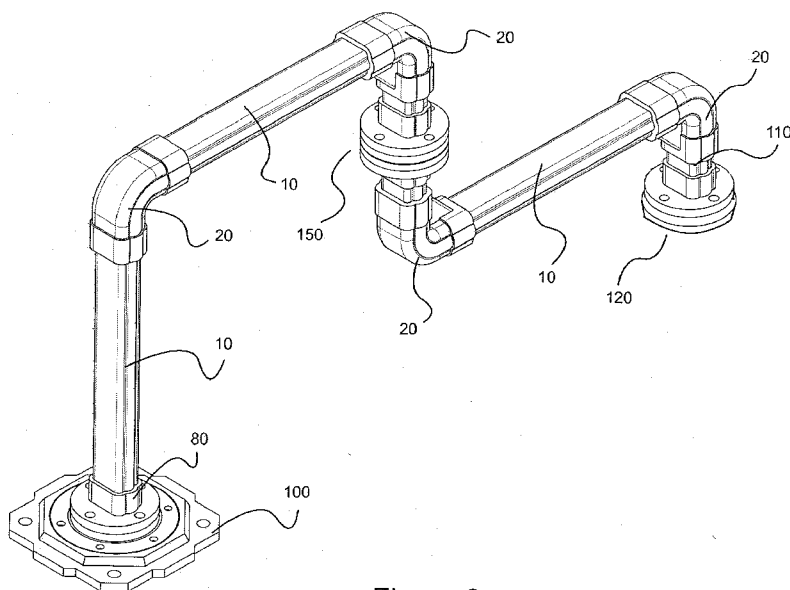


Figure 6

(57) Abstract: The subject matter invention relates to a movable arm carrying a panel connected to a machine or to the ground from one side and connected to pieces like panel from the other side, and providing movement of pieces and comprising at least an upper connection module (140), a panel connection module (120), a profile (10) and a vertical return bend (20). As an improvement, there is a movable bottom flange (40) having a peripheral channel (41) on the top surface, pluralities of balls (44) provided on the peripheral channel (41) and a movable top flange (50) having pluralities of ball housings (54) wherein the balls (44) are disposed, which are connected to each other so as to form a hinge (150) rotatable to the right and to the left.



## SPECIFICATION

### A MOVABLE ARM CARRYING A PANEL

#### 5 TECHNICAL FIELD

The present invention relates to a movable arm carrying a panel connected to a machine or to the ground from one side and connected to pieces like panel from the other side, and providing movement of pieces and comprising at least an upper connection module, a panel  
10 connection module, a profile and a vertical return bend.

#### PRIOR ART

In general, in machine sector, movable arms carrying a panel are used for providing the  
15 movement of the control panel controlling the machine for facilitating operation of the operators. In this manner, operator brings the control panel to the operation region of the machine, and intervention to the machine, when required, is realized in a rapid manner.

In the utility model document 2009/04986, a panel carrying arm is disclosed which is  
20 connected to the machine without the need for an additional piece. The load carrying capacity of said arm is not sufficient, and when a load is applied on the arm, vibrations, stretching and bending in the profile are occurring and the arms are vibrating in the joint regions.

25 As a result, because of the abovementioned problems, an improvement is required in the related technical field.

#### BRIEF DESCRIPTION OF THE INVENTION

30 The present invention relates to a novel movable arm carrying a panel, in order to eliminate the abovementioned problems and to bring new advantages to the related technical field.

The main object of the present invention is to provide a movable arm carrying a panel where the return direction and the load carrying capacity are increased.

35

Another object of the present invention is to provide a movable arm carrying a panel where no vibration and no oscillation occur in the joint regions when the carried load is increased.

In order to realize all of the abovementioned objects and the objects which are to be deducted from the detailed description below, the present invention is a movable arm carrying a panel connected to a machine or to the ground from one side and connected to pieces like panel from the other side, and providing movement of pieces and comprising at least an upper connection module, a panel connection module, a profile and a vertical return bend. Accordingly, as an improvement, the present invention comprises a movable bottom flange having a peripheral channel on the top surface, pluralities of balls provided on the peripheral channel and a movable top flange having pluralities of ball housings wherein the balls are disposed, which are connected to each other so as to form a hinge rotatable to the right and to the left.

In a preferred embodiment of the subject matter invention, at least one horizontal return bend is provided having connection opening at two ends thereof so as to provide the piece to be carried in the horizontal position.

In a preferred embodiment of the subject matter invention, the hinge comprises one each profile connection apparatus connected to the movable bottom flange and the movable top flange.

In another preferred embodiment of the subject matter invention, the movable bottom flange comprises at least two pin housings provided at a vicinity of the edge thereof and wherein pin can be hammered.

In another preferred embodiment of the subject matter invention, there are eight pin housings.

In another preferred embodiment of the subject matter invention, the movable top flange comprises at least one lateral surface having at least one lock protrusion so as to provide rotation at an angle between the pins hammered to the pin housing provided at the movable bottom flange.

In another preferred embodiment of the subject matter invention, at least one rib is provided extending between the connection openings of the vertical return bend.

In another preferred embodiment of the subject matter invention, the vertical return bend comprises a coating opening in arc form and a coating provided so as to coat said coating opening.

- 5 In another preferred embodiment of the subject matter invention, the profile connection apparatus comprises a profile connection opening wherein the profile is disposed.

In another preferred embodiment of the subject matter invention, at least one rib is provided extending between the connection openings of the horizontal return bend.

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In another preferred embodiment of the subject matter invention, the horizontal return bend comprises a coating opening in arc form and a coating provided so as to coat said coating opening.

- 15 In another preferred embodiment of the subject matter invention, a movement group is formed by a movable bottom flange, a movable top flange, and a hub disposed to an opening provided in the middle of the movable top flange.

- 20 In another preferred embodiment of the subject matter invention, moreover, a lateral connection apparatus is provided comprising a fixation part and an L-like bend part, which are provided in one-piece form.

- 25 In another preferred embodiment of the subject matter invention, a coating opening is provided in arc form on the bend part of the lateral connection apparatus and a coating is provided so as to coat the coating opening.

- 30 In another preferred embodiment of the subject matter invention, the panel connection module comprises a panel connection apparatus so as to be connected to the panel, a movement group connected to the panel connection apparatus, and a profile connection apparatus provided on the movement group.

- 35 In another preferred embodiment of the subject matter invention, the top connection module is formed by connecting the movement group and the profile connection apparatus to a fixed connection apparatus having connection housings so as to be connected to the machine.

In another preferred embodiment of the subject matter invention, moreover, a lateral connection module is provided formed by respectively connecting profile connection

apparatus, movement group and profile connection apparatus to the lateral connection apparatus.

5 In another preferred embodiment of the subject matter invention, moreover, a fixed panel module is provided formed by respectively connecting panel connection apparatus and movement group to the fixed connection apparatus.

#### **BRIEF DESCRIPTION OF THE FIGURES**

10 In Figure 1, a representative view of a profile which is a member of the subject matter movable arm carrying a panel is given.

In Figure 2a, a representative view of a vertical return bend which is a member of the subject matter movable arm carrying a panel is given.

15 In Figure 2b, a representative view of a horizontal return bend which is a member of the subject matter movable arm carrying a panel is given.

20 In Figure 3a, a representative view of a movable bottom flange which is a member of the subject matter movable arm carrying a panel is given.

In Figure 3b, a perspective top representative view of a movable upper flange which is a member of the subject matter movable arm carrying a panel is given.

25 In Figure 3c, a perspective bottom representative view of the movable top flange which is a member of the subject matter movable arm carrying a panel is given.

30 In Figure 3d, a perspective representative view of a hub which is a member of the subject matter movable arm carrying a panel is given.

In Figure 3e, the lateral representative view of a hub which is a member of the subject matter movable arm carrying a panel is given.

35 In Figure 4a, a representative view of a panel connection apparatus which is a member of the subject matter movable arm carrying a panel is given.

In Figure 4b, a representative view of a profile connection apparatus which is a member of the subject matter movable arm carrying a panel is given.

5 In Figure 4c, a representative view of a lateral connection apparatus which is a member of the subject matter movable arm carrying a panel is given.

In Figure 4d, a representative view of a fixed connection apparatus which is a member of the subject matter movable arm carrying a panel is given.

10 In Figure 4e, a representative view of an intermediate piece which is a member of the subject matter movable arm carrying a panel is given.

In Figure 5a, a representative view of a panel connection module which is a member of the subject matter movable arm carrying a panel is given.

15 In Figure 5b, a representative view of a lateral connection module which is a member of the subject matter movable arm carrying a panel is given.

20 In Figure 5c, a representative view of a top connection module which is a member of the subject matter movable arm carrying a panel is given.

In Figure 5d, a representative view of a hinge which is a member of the subject matter movable arm carrying a panel is given.

25 In Figure 5e, a representative view of a fixed panel module which is a member of the subject matter movable arm carrying a panel is given.

30 In Figure 6, a representative view of an application of the subject matter movable arm carrying a panel is given.

#### REFERENCE NUMBERS

10 Profile

11 Wall

35 12 Short edge

13 Connection housing

- 20 Vertical return bend
- 21 Connection opening
- 22 Connection housing
- 23 Coating opening
- 5 24 Coating
- 25 Rib
  
- 30 Horizontal return bend
- 31 Connection opening
- 10 32 Connection housing
- 33 Coating opening
- 34 Coating
- 35 Rib
  
- 15 40 Movable bottom flange
- 41 Peripheral channel
- 42 Connection housing
- 43 Opening
- 44 Ball
- 20 45 Pin housings
  
- 50 Movable top flange
- 51 Opening
- 511 Wall
- 25 512 Hub channel
- 52 Lateral surface
- 53 Lock protrusion
- 54 Ball housing
- 55 Connection housing
- 30
- 60 Hub
- 61 Flange tab
- 62 Connection housing
- 63 Opening
- 35 70 Panel connection apparatus
- 71 Connection housing
- 72 Opening

- 73 Inclined part
  
- 80 Profile connection apparatus
- 81 Connection protrusion
- 5 811 Profile connection opening
- 812 Connection housing
- 82 Connection housing
  
- 90 Lateral connection apparatus
- 10 91 Fixation part
- 911 Connection housing
- 92 Bend part
- 921 Connection opening
- 922 Coating opening
- 15 923 Coating
  
- 100 Fixed connection apparatus
- 101 Connection housing
- 102 Opening
- 20 103 Connection housing
  
- 110 Intermediate piece
- 120 Panel connection module
- 130 Lateral connection module
- 25 140 Top connection module
- 150 Hinge
- 160 Fixed panel module

## THE DETAILED DESCRIPTION OF THE INVENTION

30

In this detailed description, the subject matter movable arm carrying a panel is described with references to examples without forming any restrictive effect in order to make the subject more understandable.

35

With reference to Figure 1, a profile (10) generally has a rectangular wall (11). There are pluralities of connection housings (13) on the short edges (12) of the wall (11). The profile (10) is made of aluminum material.

With reference to Figure 2a, the vertical return bend (20) has an arc-like form and there are one each rectangular connection openings (21) at the two ends thereof such that the profile (10) is disposed therein. The wall of the connection opening (21) is wider than the wall (11) of the profile (10) in order for the profile (10) to be disposed. The vertical return bend (20) comprises at least one rib (25) so as to extend in a crosswise manner between the two connection openings (21). Pluralities of connection housings (22) are provided around the connection openings (21). There is a coating opening (23) in the arc part so as to expose the connection housings (22) for the placement of connection element into the connection housings (22); and a coating (24) in arc form covers the coating opening (23). The rib (25) minimizes the bending capability of movable arm, carrying the panel, in long and heavy applications, and increases the carrying capacity of the movable arm by an amount of 80 % when compared with the prior art.

With reference to Figure 2b, the horizontal return bend (30) has the same embodiment as the vertical return bend (20). The horizontal return bend (30) comprises one each rectangular connection openings (31) at the two ends thereof such that the profile (10) is disposed therein. The horizontal return bend (30) comprises at least one rib (35) so as to extend in a crosswise manner between the two connection openings (31). Pluralities of connection housings (32) are provided around the connection openings (31). In order to dispose connection element into the connection housings (32), there is a coating opening (33) in the arc part so as to expose the connection housings (32) for the placement of connection element into the connection housings (32); and a coating (34) in arc form covers the coating opening (33). The horizontal return bend (30) is utilized so that the panel carrying arm can realize horizontal rotation.

With reference to Figure 3a, a movable bottom flange (40) has a circular form and it has a peripheral channel (41) on the top surface thereof. There is a circular opening (43) in the middle of the movable bottom flange (40) and there are pluralities of connection housings (42) in the part of the upper surface close to the opening (43). Movable balls (44) are provided inside the peripheral channel (41) of the movable bottom flange (40). Pluralities of pin housings (45) are formed on the wall of the movable bottom flange (40). Depending on the predetermined rotation angle, pin is hammered to the pin housings (45) and a rotation with said angle is provided in the modules to be formed.

With reference to Figure 3b and 3c, a movable top flange (50) has a ring form and it has a circular opening (51) in the intermediate part thereof. The top part of the wall (511) of the

opening (51) is defined in the form of a hub channel (512). There is a lock protrusion (53) on the lateral surface (52). There are ball housings (54), wherein the balls (44) are disposed, on the bottom surface of the movable top flange (50). When the balls (44) are disposed to the ball housing (54), a gap of approximately 1.5 mm is left in between. There are connection housings (55) around the opening (51). The rotation of the movable top flange (50) is provided between the pins hammered to the pin housings (45) of the movable bottom flange (40). The lock protrusion (53) cannot move when it is corresponding to the pin housings (45) where pin is hammered.

10 With reference to Figure 3d and 3e, a hub (60) has a circular structure and it has a circular opening (63) in the middle thereof. A flange tab (61) is formed as a result of stepped embodying of the top part of the wall so as to be disposed to the hub channel (512) of the movable bottom flange (50). There are pluralities of connection housings (62) along the periphery of the opening (63).

15 With reference to Figure 4a, the panel connection apparatus (70) has a circular form so as to have a circular opening (72) in the middle thereof. There are pluralities of connection housings (71) around the opening (72). The two mutual parts of the wall define the inclined parts (73). When a panel with an edge narrower than the diameter is put on the panel connection apparatus (70), no excess part is visible by means of the inclined parts (73) of the panel connection apparatus (70).

20 With reference to Figure 4b, a profile connection apparatus (80) has a circular form and comprises a connection protrusion (81) having a rectangular profile connection opening (811) wherein a profile (10) is disposed. There are pluralities of connection housings (82) for providing the connection thereof to the ground or to the machine. There are connection housings (812) on the inner side of the profile connection opening (811).

30 With reference to Figure 4c, the lateral connection apparatus (90) has a combined view of a profile connection apparatus (80) and of a vertical return bend (20). The part thereof to be connected to the machine has a square-like form and it is described as the fixation part (91). The fixation part (91) comprises connection housings (911) thereon. The bend part (92), which is in L-like form, comprises a connection opening (921) such that the profile (10) is disposed. There is a coating opening (922) in the arc part so as to expose the connection housings (911) for the placement of connection element into the connection housings (911); and a coating (923) in arc form covers the coating opening (922). This provides the movable

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arm to be connected to the lateral side of the machine when the region on the machine is narrow.

5 With reference to Figure 4d, the fixed connection apparatus (100) has a square-like form and it has a circular opening (102) in the middle thereof. There are connection housings (103) on the four corners thereof. There are connection housings (101) compliant to the connection housings (42) of the movable bottom flange (40) around the opening (102). A reinforcement frame is provided on the machine in the region where the fixed connection apparatus (100) is connected to the machine. Thus, the material of the machine and the movable arm's carrying  
10 capability are reinforced.

With reference to Figure 4e, an intermediate piece (110) is embodied in the form of a short profile (10).

15 With reference to Figure 5a, a panel connection module (120) is formed by connecting a movable bottom flange (40), a movable top flange (50), a hub (60) and profile connection apparatus (80) onto the panel connection apparatus (70). When the movable upper flange (50) is disposed on the movable bottom flange (40), balls (44) are rotating inside the peripheral channel (41) and the circular movement of the panel connection module (120) is provided. The hub (60) is disposed to the movable upper flange (50) opening (51), and the flange tab (61) of the hub (60) is disposed to the hub channel (512) of the movable top flange (50). The hub (60) is connected to the connection housings (42) of the movable bottom flange (40) through the connection housings (62) and to the connection housings (71) of the panel connection apparatus (70). The profile connection apparatus (80) is disposed to the top  
20 part. The connection element is disposed to the connection housings (812) in the profile connection apparatus (80) and the same connection element is disposed to the connection housings (55) provided on the moveable top flange (50). In the panel connection module (120), the movable top flange (50) is moving by means of the rotation of the balls (44) and they rotate the panel connection module (120).

30 With reference to Figure 5b, while the lateral connection module (130) is being formed, the connection protrusion (81) of the profile connection apparatus (80) is disposed to the connection opening (921) of the lateral connection apparatus (90), and they are connected to each other. A movable bottom flange (40), a movable top flange (50), a hub (60) and again a  
35 profile connection apparatus (80) are connected to the profile connection apparatus (80).

With reference to Figure 5c, the top connection module (140) is formed by connecting the movable bottom flange (40), movable top flange (50), hub (60) and profile connection apparatus (80) onto the fixed connection apparatus (100).

5 With reference to Figure 5d, one each profile connection apparatus (80) are fixed to the two vertical return bends (20) while a hinge (150) is being formed, and a movable bottom flange (40), a movable top flange (50) and a hub (60) are disposed in between. The connection protrusions (81) of the profile connection apparatus (80) are disposed to the connection openings (21) of the vertical return bend (20). The hinge (150) is used and the panel carrying  
10 arm is provided to turn to opposite directions simultaneously.

The movable bottom flange (40), the movable top flange (50) and the hub (60) are interconnected to each other, and they form a movement group.

15 With reference to Figure 5e, while the fixed panel module (160) is being formed, movement group is added to the fixed connection apparatus (100) and panel connection apparatus (70) is connected to the top part. The connection housings (71), provided on the panel connection apparatus (70), are compliant to the panels of the international panel standards. The fixed panel module (160) is used when a panel is desired to be fixed to one side of the machine.

20 By means of different connection types of the apparatus (10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110) and of the modules (120, 130, 140, 150), movable arms, carrying panels, can be formed for different purposes and in different types. With reference to Figure 6, in the preferred application of the present invention, while the connection of the panel connection  
25 module (120) to the panel is provided, first of all, the panel connection apparatus (70) is connected to the panel. An intermediate piece (110) is fixed to the panel connection module (120), and the intermediate piece (110) is disposed to the connection opening (21) of the vertical return bend (20). A profile (10) is disposed to the connection opening (21) provided on the other side of the vertical return bend (20) and again a vertical return bend (20) is  
30 connected. The profile (10) is connected in a snap-fit manner to the vertical rotation bends (20), moreover, connection elements are disposed to the connection housings (13, 22) and thereby the connection is reinforced. A profile (10) is disposed to the vertical return bend (20) in a vertical position and the other end of the profile (10) is connected to the profile connection apparatus (80). Afterwards, a movement group is used, and connection of the  
35 movement group to the fixed connection apparatus (100) is provided.

The protection scope of the present invention is set forth in the annexed Claims and cannot be restricted to the illustrative disclosures given above, under the detailed description. It is because a person skilled in the relevant art can obviously produce similar embodiments under the light of the foregoing disclosures, without departing from the main principles of the present invention.

5

**CLAIMS**

1. A movable arm carrying a panel connected to a machine or to the ground from one side and connected to pieces like panel from the other side, and providing movement of the said pieces and comprising at least an upper connection module (140), a panel connection module (120), a profile (10) and a vertical return bend (20), **characterized** by comprising a movable bottom flange (40) having a peripheral channel (41) on the top surface, pluralities of balls (44) provided on the peripheral channel (41) and a movable top flange (50) having pluralities of ball housings (54) wherein the balls (44) are disposed, which are connected to each other so as to form a hinge (150) rotatable to the right and to the left simultaneously.
2. A movable arm carrying a panel according to Claim 1, **characterized** in that at least one horizontal return bend (30) having connection opening (31) at two ends thereof is provided so as to provide the piece to be carried in the horizontal position.
3. A movable arm carrying a panel according to Claim 1, **characterized** in that the hinge (150) comprises one each profile connection apparatus (80) connected to the movable bottom flange (40) and the movable top flange (50).
4. A movable arm carrying a panel according to Claim 3, **characterized** in that the movable bottom flange (40) comprises at least two pin housings (45) provided at a vicinity of the edge thereof and wherein pin can be hammered.
5. A movable arm carrying a panel according to Claim 4, **characterized** by comprising eight pin housings (45).
6. A movable arm carrying a panel according to Claim 4, **characterized** in that the movable top flange (50) comprises at least one lateral surface (52) having at least one lock protrusion (53) so as to provide rotation at an angle between the pins hammered to the pin housing (45) provided at the movable bottom flange (40).
7. A movable arm carrying a panel according to Claim 1, **characterized** in that at least one rib (25) is provided extending between the connection openings (21) of the vertical return bend (20).
8. A movable arm carrying a panel according to Claim 7, **characterized** in that the vertical return bend (20) comprises a coating opening (23) in arc form and a coating (24) provided so as to coat said coating opening (23).

9. A movable arm carrying a panel according to Claim 3, **characterized** in that the profile connection apparatus (80) comprises a profile connection opening (811) wherein the profile (10) is disposed.

5

10. A movable arm carrying a panel according to Claim 2, **characterized** in that at least one rib (35) is provided extending between the connection openings (31) of the horizontal return bend (30).

10

11. A movable arm carrying a panel according to Claim 10, **characterized** in that the horizontal return bend (30) comprises a coating opening (33) in arc form and a coating (34) provided so as to coat said coating opening (33).

15

12. A movable arm carrying a panel according to Claim 1, **characterized** in that a movement group is formed by a movable bottom flange (40), a movable top flange (50), and a hub (60) disposed to an opening (51) provided in the middle of the movable top flange (50).

20

13. A movable arm carrying a panel according to Claim 1, **characterized** by comprising a lateral connection apparatus (90) comprising a fixation part (91) and an L-like bend part (92), which are provided in one-piece form.

25

14. A movable arm carrying a panel according to Claim 13, **characterized** in that a coating opening (922) is provided in arc form on the bend part (92) of the lateral connection apparatus (90) and a coating (923) is provided so as to coat the coating opening (922).

30

15. A movable arm carrying a panel according to Claim 1, **characterized** in that the panel connection module (120) comprises a panel connection apparatus (70) so as to be connected to the panel, a movement group connected to the panel connection apparatus (70), and a profile connection apparatus (80) provided on the movement group.

35

16. A movable arm carrying a panel according to Claim 1, **characterized** in that the top connection module (140) is formed by connecting the movement group and the profile connection apparatus (80) to a fixed connection apparatus (100) having connection housings (101) so as to be connected to the machine.

40

17. A movable arm carrying a panel according to Claim 1, **characterized** in that a lateral connection module (130) is provided formed by respectively connecting profile

connection apparatus (80), movement group and profile connection apparatus (80) to the lateral connection apparatus (90).

- 5 18. A movable arm carrying a panel according to Claim 1, **characterized** in that a fixed panel module (160) is provided formed by respectively connecting panel connection apparatus (70) and movement group to the fixed connection apparatus (100).

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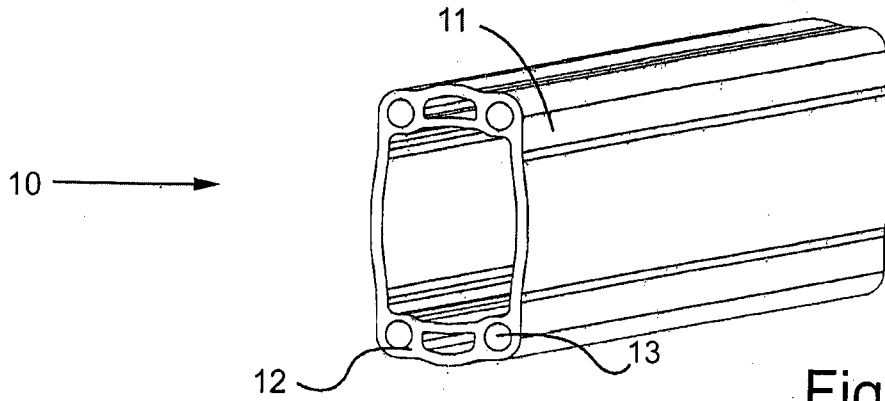


Figure 1

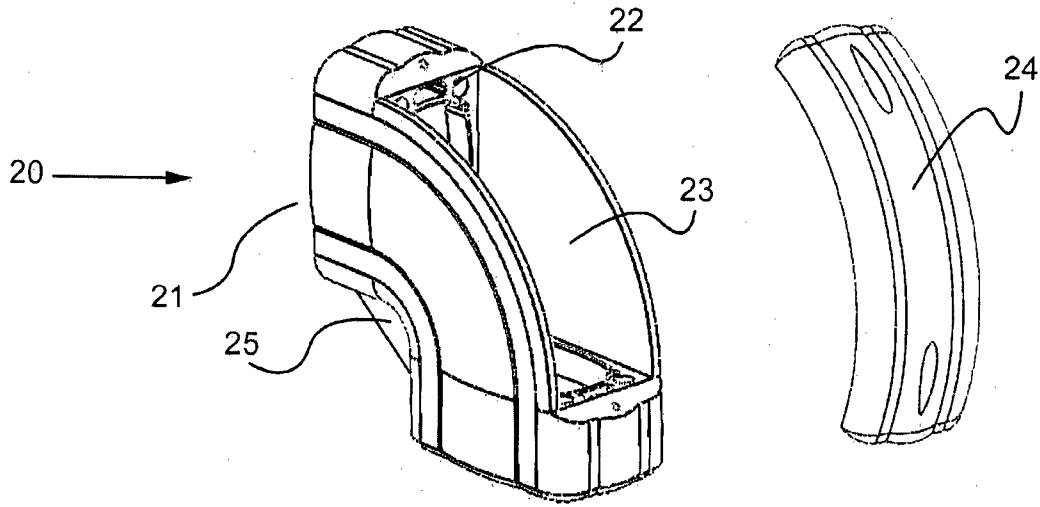


Figure 2a

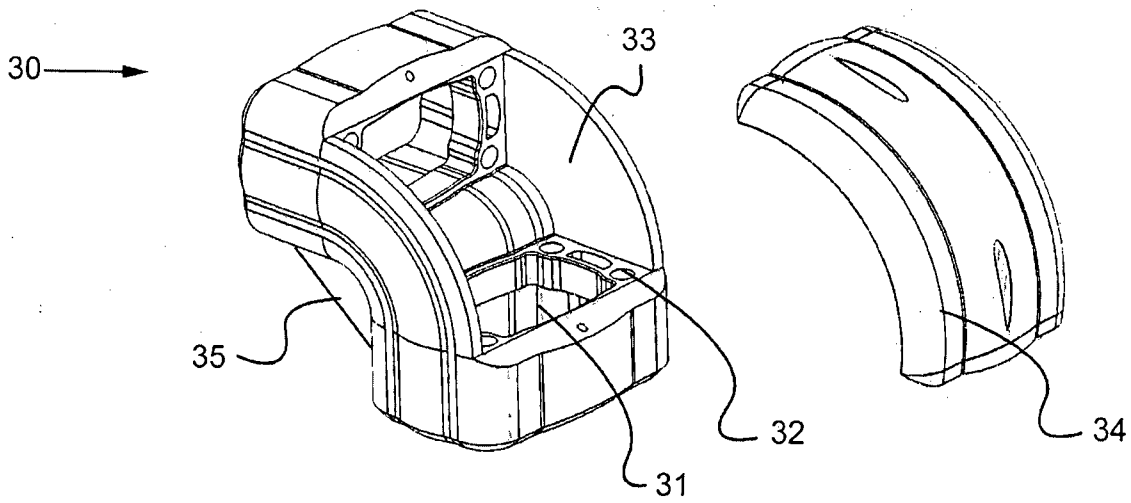


Figure 2b

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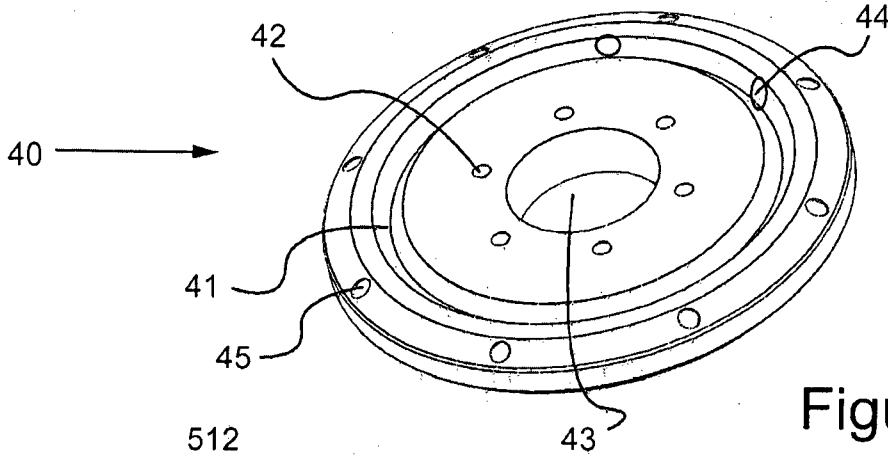


Figure 3a

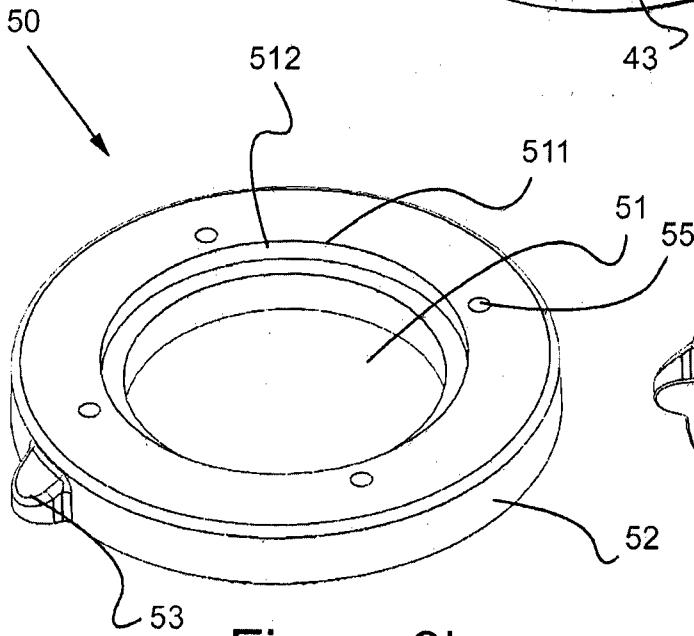


Figure 3b

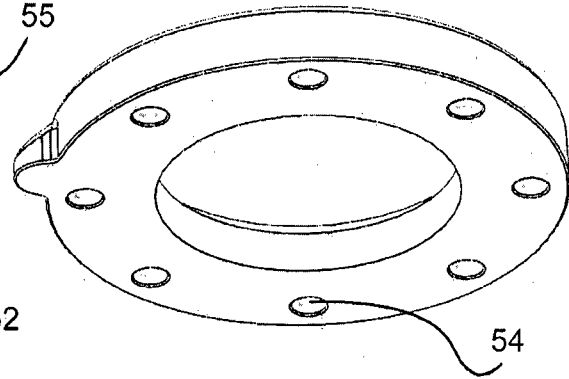


Figure 3c

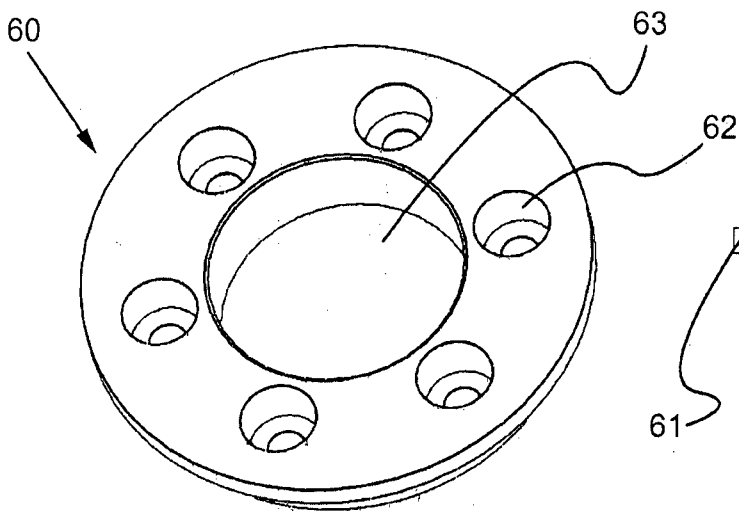


Figure 3d

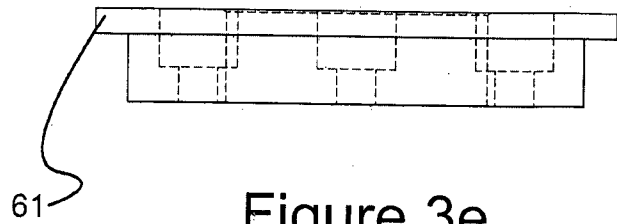


Figure 3e

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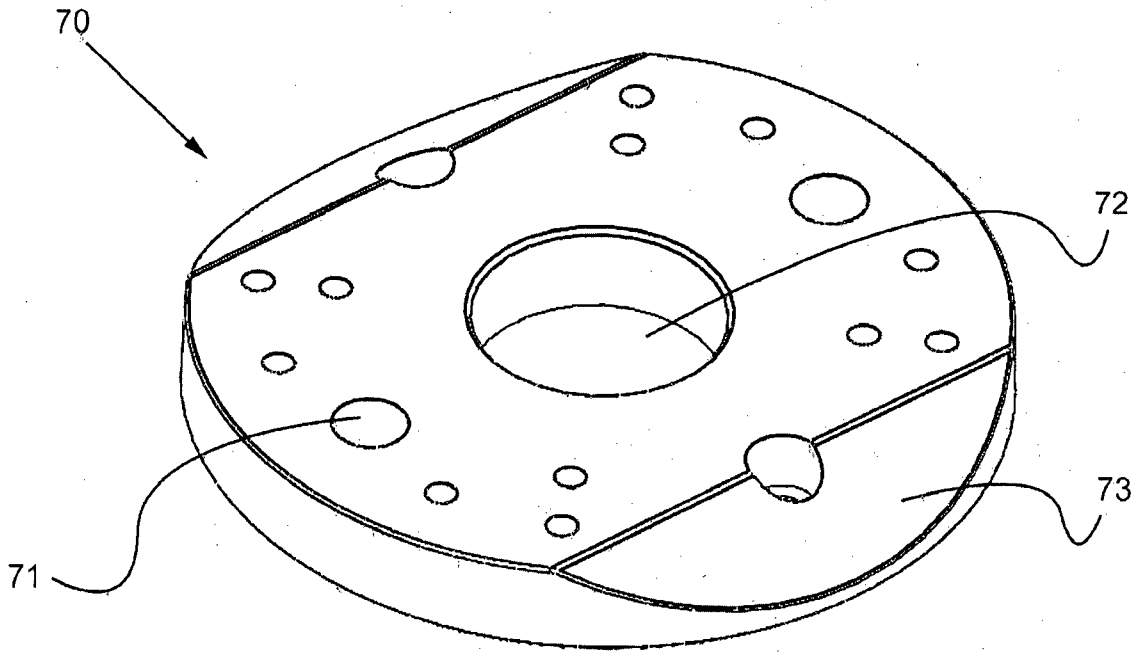


Figure 4a

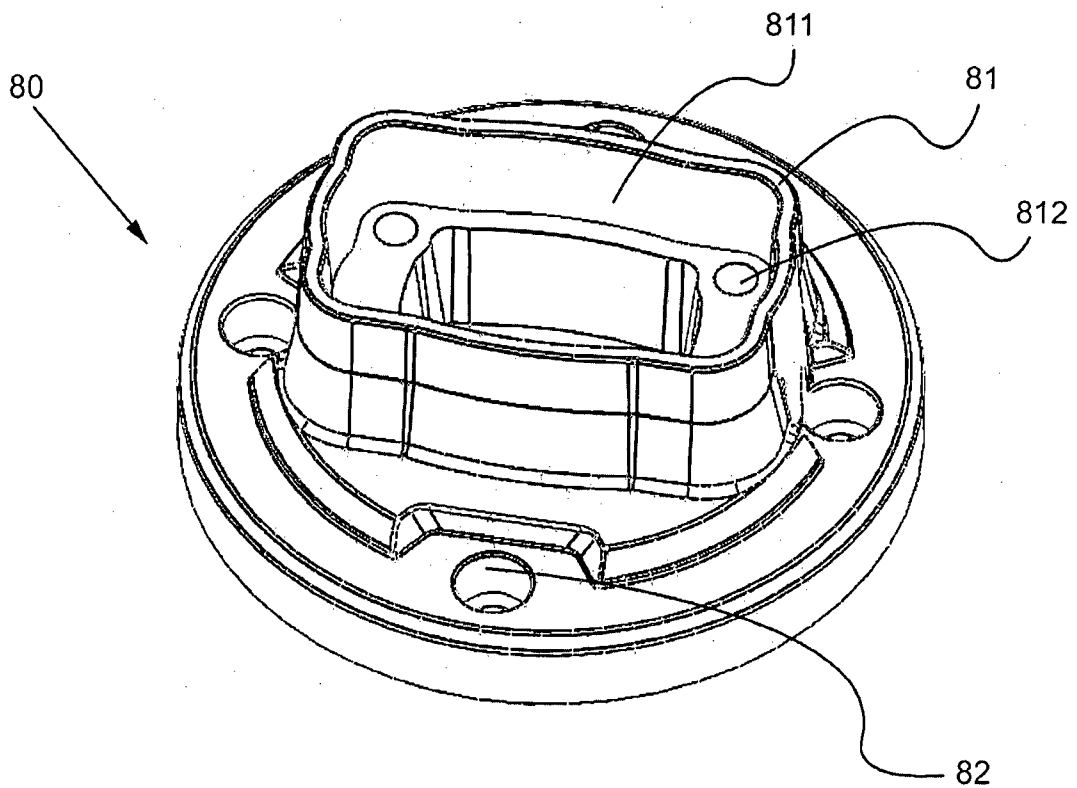


Figure 4b

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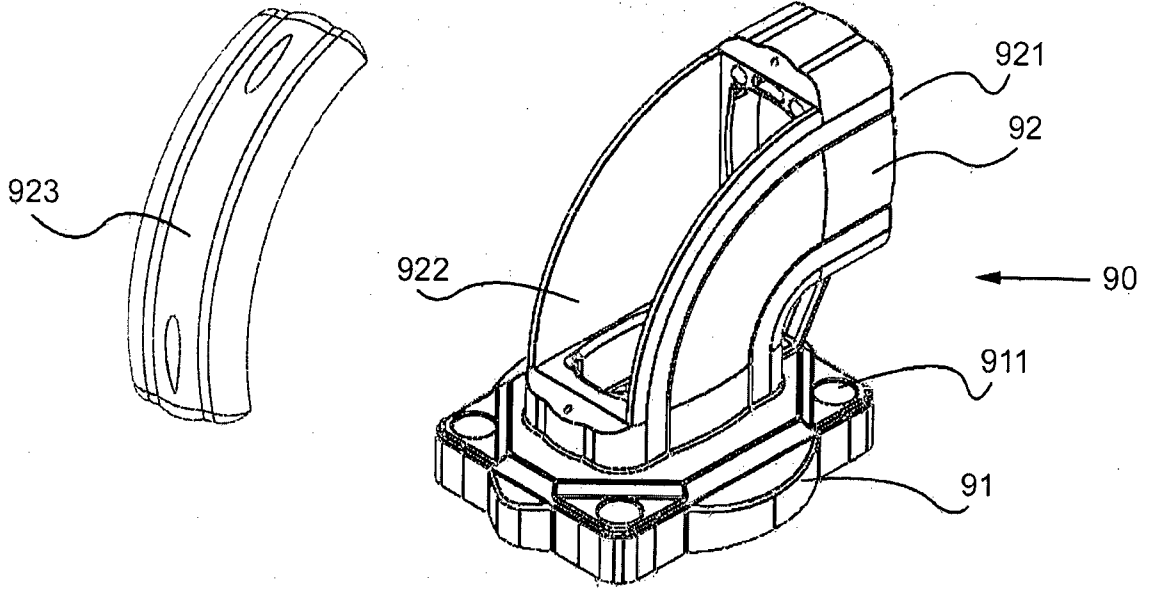


Figure 4c

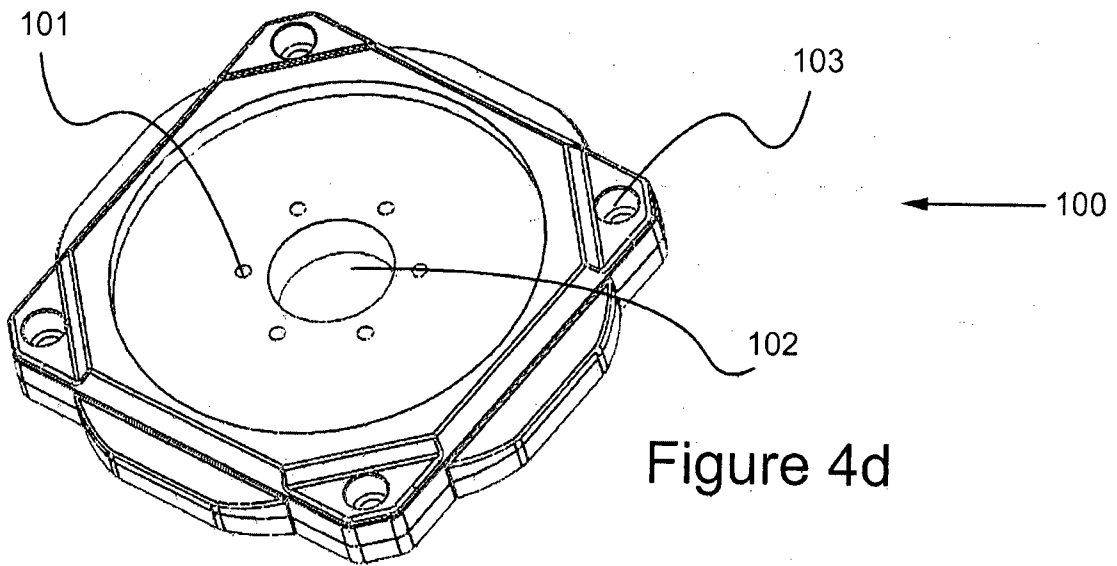


Figure 4d

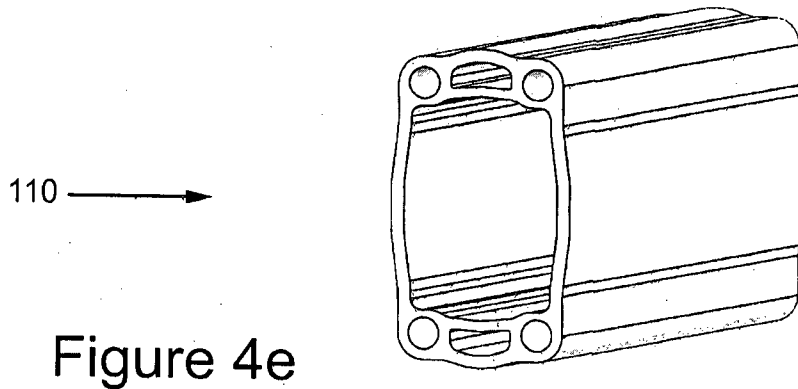


Figure 4e

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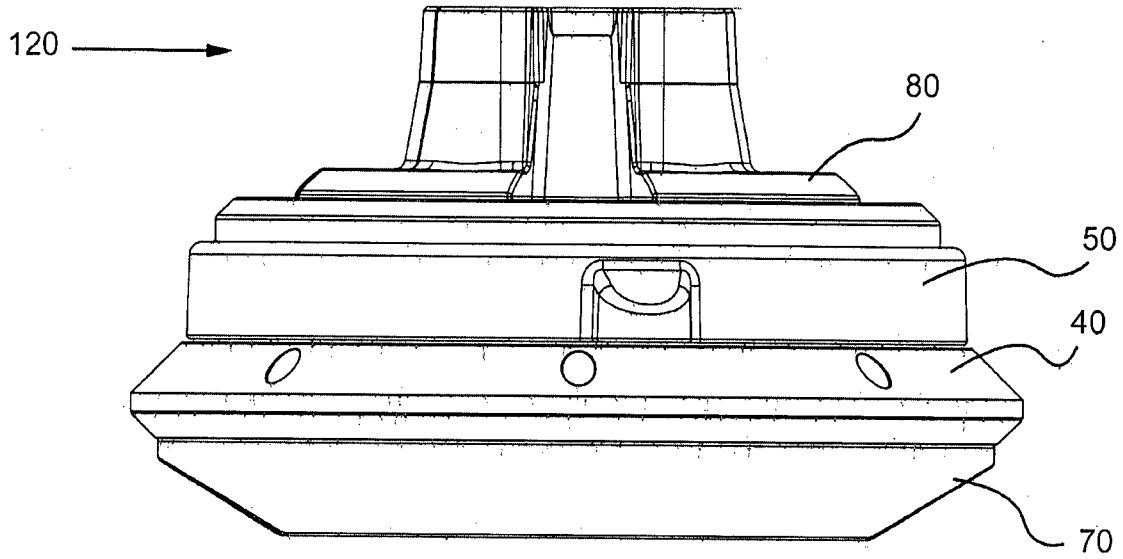


Figure 5a

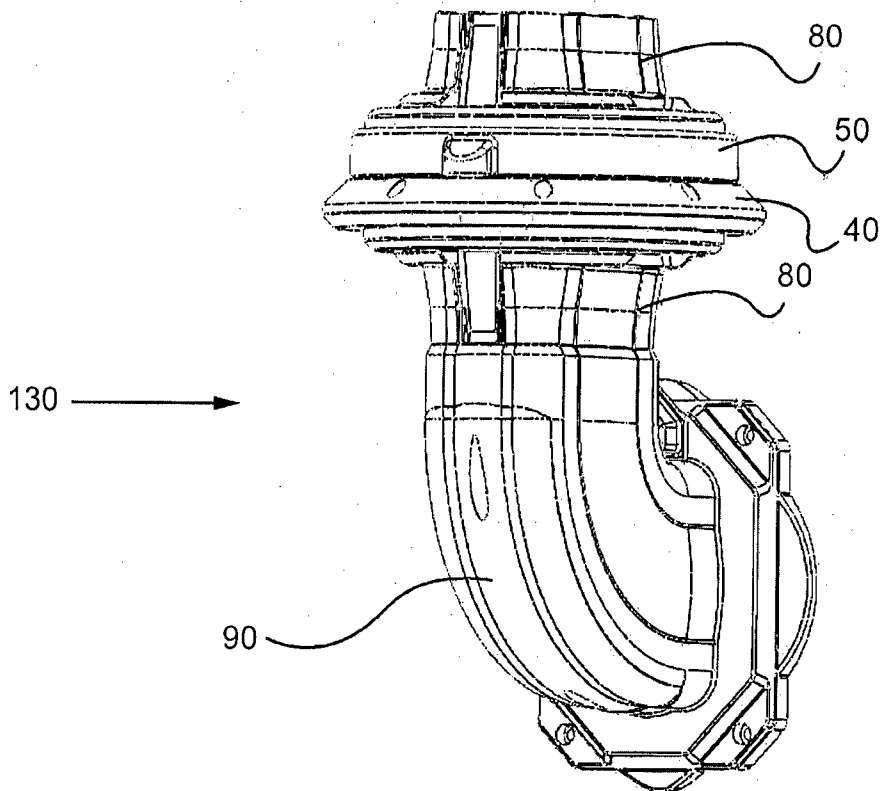


Figure 5b

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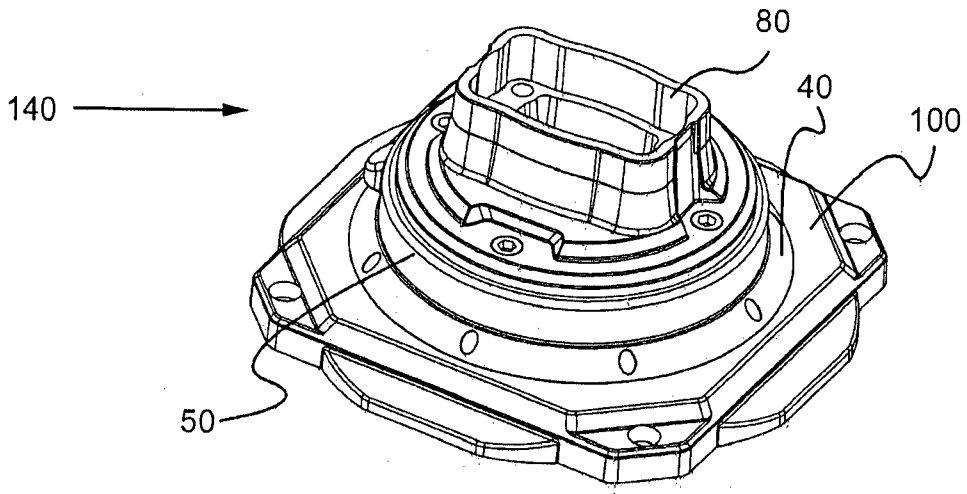


Figure 5c

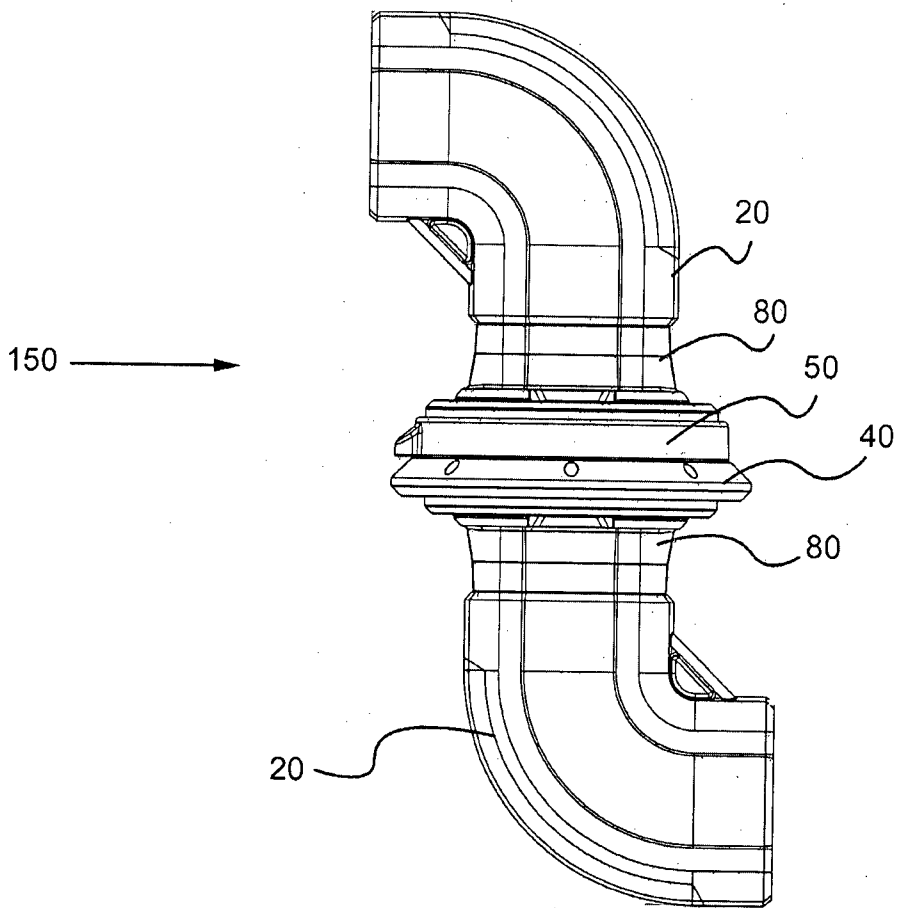


Figure 5d

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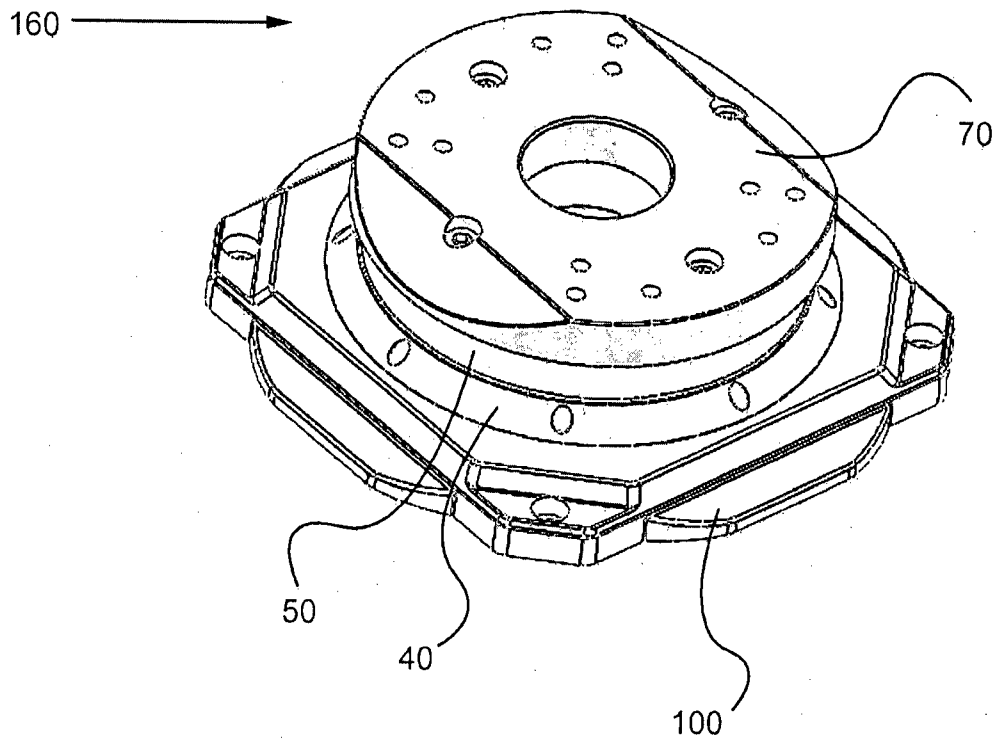


Figure 5e

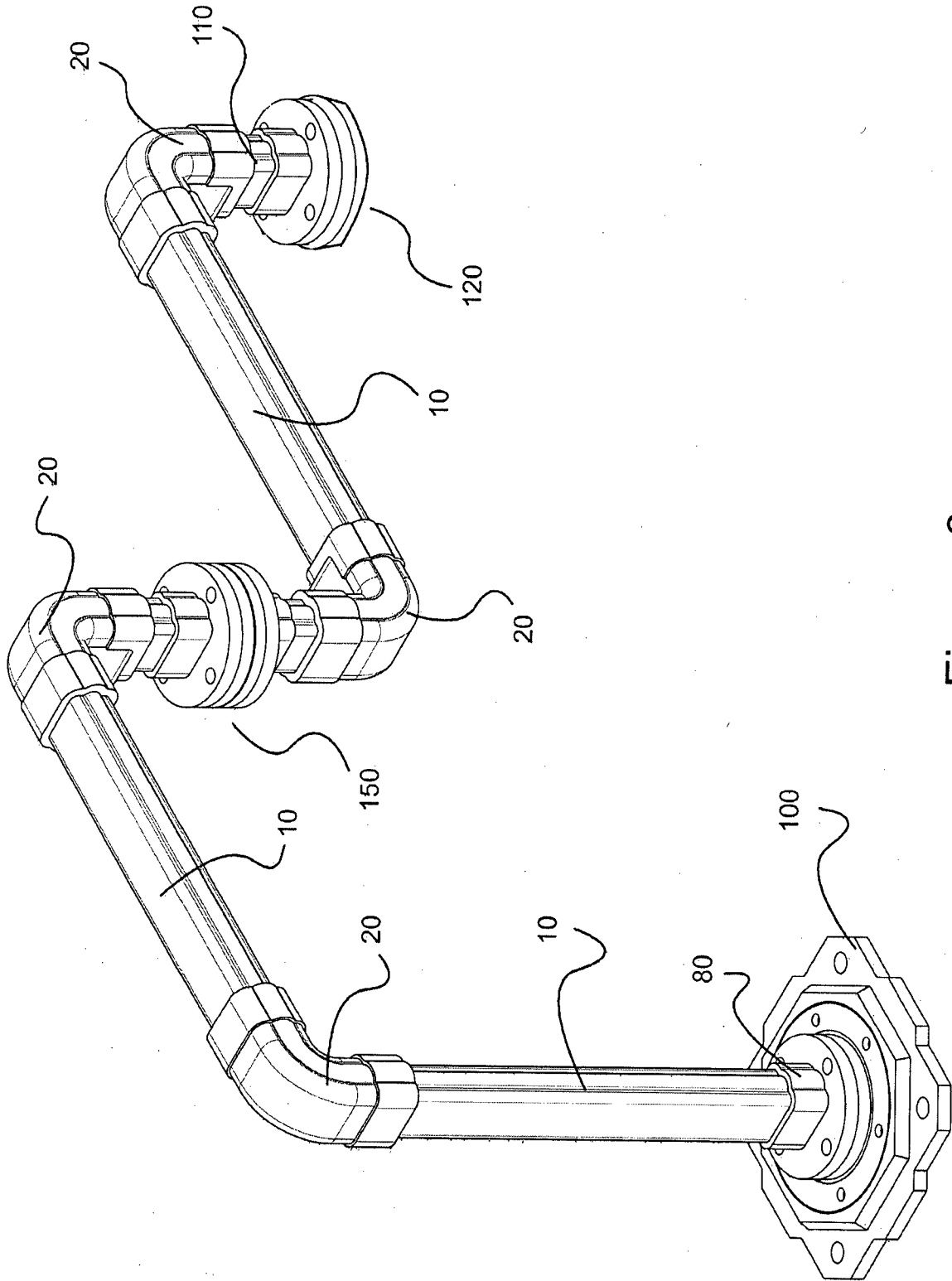


Figure 6