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(54) **Gathering and pleating device for flexible tubular containers**

(57) The gathering and pleating device comprises a series of pairs of thin, elongated sheet metal pieces (15,15',16,16') that occupy the outside and the inside of a mesh tube used to make sections forming a number of bags. The pieces are placed on a frame plate (2) that supports them in symmetry with respect to a vertical middle plane and with the cooperation, of some coordinated pneumatic drive cylinders (4,4',5).

Applicable to the gathering and pleating of the mouths of the bags formed by the sections of mesh tube.

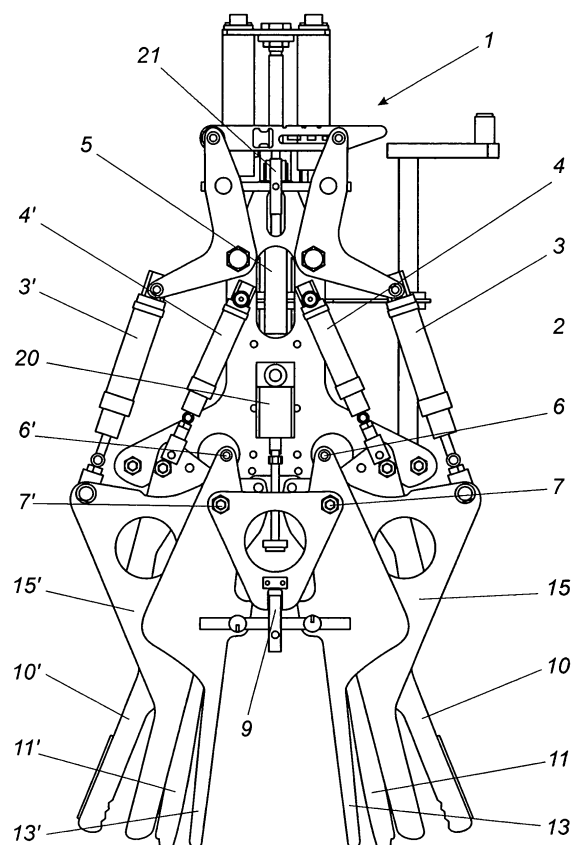


Fig. 1

Description**OBJECT OF THE INVENTION**

[0001] This invention refers to a gathering and pleating device for flexible tubular containers.

FIELD OF THE INVENTION

[0002] The field is that of machines that pack products such as pieces of fruit and similar into cylindrical mesh bags with a tubular-shaped reticulated structure.

BACKGROUND OF THE INVENTION

[0003] The known machines for packing pieces of fruit in mesh bags employ a large range of devices to fill the bags. These include the object of patent EP 1.179.477, which is held by the applicant, and also patents ES 1.061.704 U, ES 2.188.389 B1 and ES 2.253.027.

[0004] As a general rule, all these devices comprise a pair of pincers that hold the container by its upper mouth in an open position while the container is being filled. After filling, the container is closed by bringing together the holding pincers and subsequently joining the (two) facing sides that form the mouth, and they come into contact by the action of some welding clamps or other similar mechanism.

[0005] The sealing devices in question present a series of functional and formal drawbacks. The threads or tapes that form the meshes of the container usually are subjected to excess tautness that causes imperfections, and the meshes even break when the containers are manipulated once they are filled.

[0006] Occasionally small sections of the threads or tapes that form the meshes project from the folded sides of the bags, causing an external defective appearance or a deficient presentation of the containers full of product.

[0007] At other times, with the devices currently used, not all of the mesh forming the bags is collected and closed by the seal weld at their mouth, resulting in the potential loss of a part of the packed product through the parts of the mesh that have not been sealed.

BRIEF DESCRIPTION OF THE INVENTION

[0008] The device to be described eliminates the above mentioned drawbacks and provides a practical, reliable system for the proposed purpose.

[0009] It comprises a series of thin, elongated sheet metal pieces to be introduced into the tubular mesh containers through their open mouth, while other pieces remain on the outside of the containers. These pieces make revolving movements around two facing rotating shafts in order to make a series of pleats in the tubular mesh and at the same time gather it together. In this way, having gathered and pleated the formed mouth of the bag, the

sheet metal pieces move upward in a linear movement so that the mouth can be closed by the corresponding device of the packing machine.

[0010] To facilitate the explanation, this description is accompanied by some drawings which show, by way of an illustrative, non-limitative example, an embodiment of a gathering, pleating device for flexible tubular containers, according to the principles of the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Figure 1 is a front elevation of the whole assembly of the new gathering and pleating device.

Figures 2 to 6 show in detail the different sheet metal pieces and complementary components pertaining to the device.

Figures 7 to 12 schematically show floor plans and lateral elevations of the different positions of the assembly of the device's sheet metal pieces in relation to the elements that form the weld sealing mechanism of the mouth of each of the containers.

DETAILED DESCRIPTION OF THE INVENTION

[0012] The elements designated with numbers in the drawings correspond to the parts indicated below.

[0013] A plate 2, functioning as a frame, has an inverted and modified Y shape, with a symmetrical configuration with respect to a central vertical plane, provided with functional perforations (figure 2), and supporting, with a symmetrical arrangement with respect to the central vertical shaft of the device, the following elements:

a first pair of symmetrical pneumatic cylinders 4 and 4' and a central pneumatic cylinder 5;

a pair of symmetrical regulating levers 8, 8' in L shape, articulated at their associated elbowed zones on their lower ends to a second pair of symmetrical pneumatic cylinders 3 and 3' (figure 3),

a pair of symmetrical exterior sheet metal pieces 15 and 15' of an elongated triangular shape, related by the above indicated cylinders 3, 3' to the above indicated levers 8, 8' (figure 3),

a second pair of exterior sheet metal pieces 16, 16' of an elongated triangular shape and similar to pieces 15, 15' and juxtaposed to them (figure 3),

a pair of central sheet metal pieces 10, 10' of an elongated trapezoid shape with appendix, articulated on rotating shafts 7, 7' to the above indicated pairs of pieces and the pneumatic cylinders 4, 4' (figure 4),

a first pair 11, 11' and a second pair 12, 12' of centering sheet metal pieces of an elongated polygonal shape with appendix, articulated on the rotating shafts 7, 7' and centrally supporting an adjustment wheel 20 (figure 5),

a first pair 13, 13' and a second pair 14, 14' of fixed

sheet metal pieces of an elongated triangular shape with appendix, articulated on the rotating shafts 6, 6' and centrally supporting the adjustment wheel 9 (figure 6).

[0014] The above components are conventionally associated with the welders 18, 18' and the masks 19, 19'.

[0015] To execute the gathering and pleating operations on the mouths of the mesh bags 17, the component elements of the described device make the movements indicated in figures 7 to 12.

[0016] The central pieces 10, 10' and the exterior pieces 15, 15', 16, 16' are located on the outside of the mesh tube 17 and the centering pieces 11, 11', 12, 12' and the fixed pieces 13, 13', 14, 14' on the inside (figure 7).

[0017] The interior sheet metal pieces are located on the apexes of the mouth and the exterior pieces approach and are inserted into lateral recesses of the tubular section (figure 8). The adjustment wheels 9 and 21 are used to regulate the precise working positions and movements of the sheet metal pieces.

[0018] The mouth of the tubular mesh section 17 is permanently closed by means of a weld made while it is kept pleated and gathered. The sheet metal pieces occupy the final positions indicated in figure 9.

[0019] The device thus described permits the gathering and pleating of the open ends or mouths of a mesh bag obtained by cutting a continuous mesh tube into pieces of equal length. Of the predominantly elongated sheet metal pieces that constitute the device, some are introduced, in a linear downward movement, into the inside of the flexible tubular section (of mesh) through its open mouth, whereas the rest of the device pieces remain on the exterior of the tubular section's perimeter.

[0020] In that position, the sheet metal pieces make some revolving movements around two symmetrically placed rotating shafts in order to make a series of pleats in the mesh walls of the tubular section and, at the same time, gather it together. Once the mouth of the tubular section is gathered and pleated, the sheet metal pieces move upward in a linear movement so that the mouth can be closed by the corresponding device of the packing machine.

[0021] Therefore, in the initial position of the device, the pneumatic cylinder 5 produces a linear downward movement of the sheet metal pieces with respect to the mouth of the mesh tube 17; the central sheet metal pieces 10, 10' remain on the outside, the centering pieces 11, 11', 12, 12' on the inside, the fixed sheet metal pieces 13, 13', 14, 14' on the inside, and the exterior sheet metal pieces 15, 15', 16, 16' on the outside.

[0022] In the first step of the bag manufacturing process, the exterior bands of a weldable material are fastened to the tubular mesh element before making the cut to form each individual bag.

[0023] The bands in question serve as a support for the brand, the packaged product specifications and other information. The handle of each bag is attached after the

bag is filled with the product and at the moment when the upper mouth of the bag is sealed.

[0024] Another device will close the lower end and, once the packing machine has conventionally proceeded to fill the bags, their mouths are gathered and pleated and subsequently sealed.

Claims

1. Gathering and pleating device for flexible tubular containers, intended for incorporation into machines that pack fruit and similar into mesh bags with a tubular-shaped reticulated structure, **characterized in that** it comprises a series of thin, elongated sheet metal pieces for introduction into the tubular mesh container and another series of pieces that remain on the outside of the container proper, allowing these pieces to make revolving movements around two facing rotating shafts in order to make pleats in the tubular container and gather it together.
2. Gathering and pleating device for flexible tubular containers, as per claim 1, **characterized in that** it comprises a plate (2) functioning as a frame that has an inverted and modified Y shape, with a symmetrical configuration with respect to a central vertical plane and supporting, with a symmetrical arrangement with respect to this central vertical plane, the rest of the device components.
3. Gathering and pleating device for flexible tubular containers, as per claims 1 and 2, **characterized in that** it also comprises a first pair of symmetrical pneumatic cylinders (4, 4') and a central pneumatic cylinder(5).
4. Gathering and pleating device for flexible tubular containers, as per claims 1 to 3, **characterized in that** it also comprises a pair of symmetrical regulating levers (8, 8') in an L shape, articulated at their elbowed zones and associated to a second pair of symmetrical pneumatic cylinders 3 and 3'.
5. Gathering and pleating device for flexible tubular containers, as per claims 1 to 4, **characterized in that** it also comprises a pair of symmetrical exterior sheet metal pieces (15, 15') of an elongated triangular shape, related by the cylinders (3, 3') to the levers (8, 8').
6. Gathering and pleating device for flexible tubular containers, as per claims 1 to 5, **characterized in that** it also comprises a second pair of exterior sheet metal pieces (16, 16') of an elongated triangular shape and similar to that of the pieces (15, 15') and juxtaposed to them.

7. Gathering and pleating device for flexible tubular containers, as per claims 1 to 6, **characterized in that** it also comprises a pair of central sheet metal pieces (10, 10') of an elongated trapezoid shape with appendix, articulated on rotating shafts (7, 7') to the above indicated pairs of sheet metal pieces and the pneumatic cylinders (4, 4'). 5
8. Gathering and pleating device for flexible tubular containers, as per claims 1 to 7, **characterized in that** it also comprises a first pair (11, 11') and a second pair (12, 12') of centering sheet metal pieces of an elongated polygonal shape with appendix, articulated on the rotating shafts (7, 7') and driven by a pneumatic cylinder (20). 10 15
9. Gathering and pleating device for flexible tubular containers, as per claims 1 to 8, **characterized in that** it also comprises a first pair (13, 13') and a second pair (14, 14') of fixed sheet metal pieces of an elongated triangular shape with appendix, articulated on the rotating shafts (6, 6') and centrally supporting an adjustment wheel (9). 20
10. Gathering and pleating device for flexible tubular containers, as per claims 1 to 9, **characterized in that** the central sheet metal pieces (10, 10') and the exterior sheet metal pieces (15, 15'; 16, 16') are located in positions corresponding to the outside of the mesh tube (17) forming the bags, and **in that** the centering sheet metal pieces (11, 11'; 12, 12') and the fixed sheet metal pieces (13, 13'; 14, 14') are located in positions corresponding to the inside of the mesh tube (17). 25 30 35

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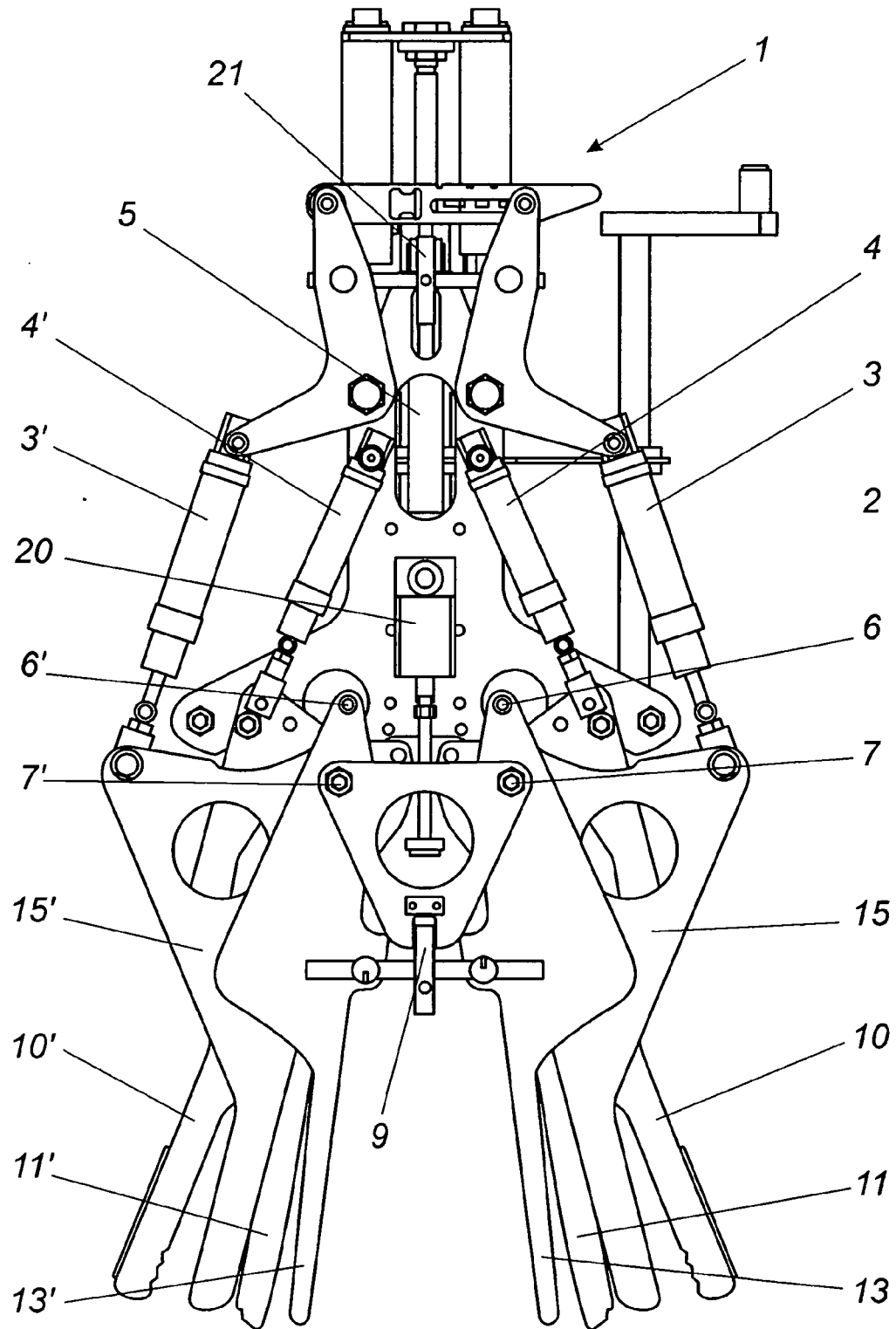


Fig. 1

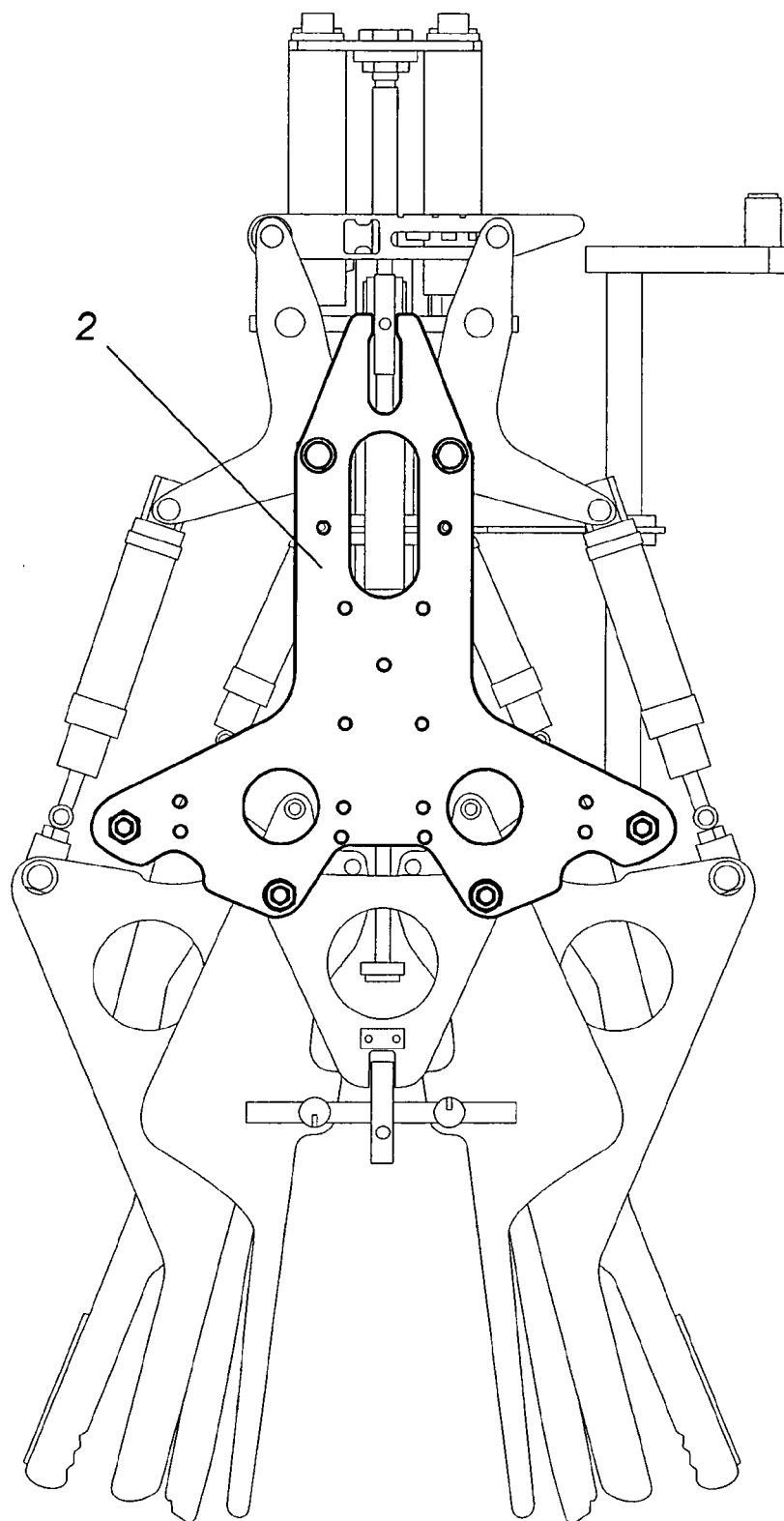


Fig. 2

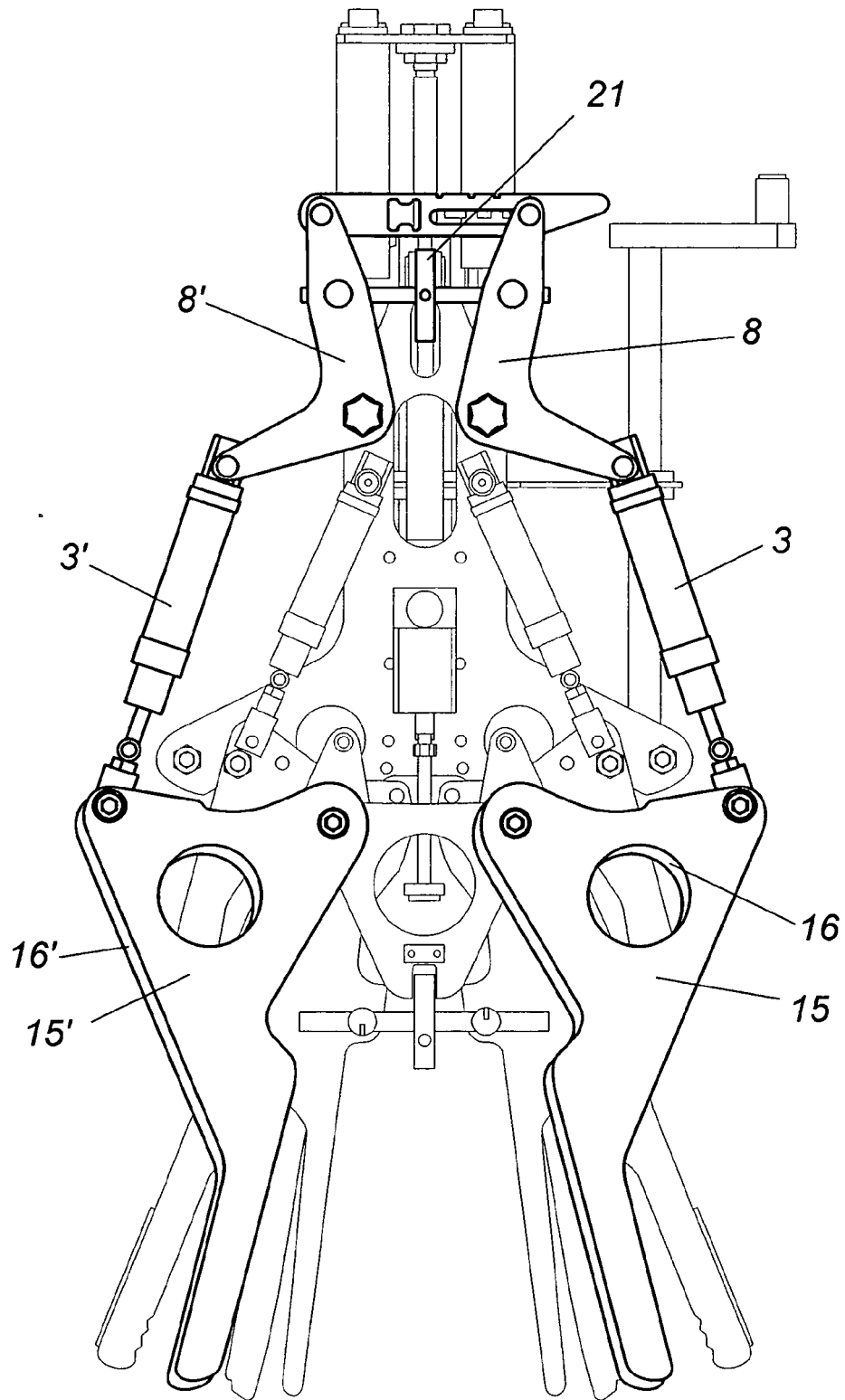


Fig. 3

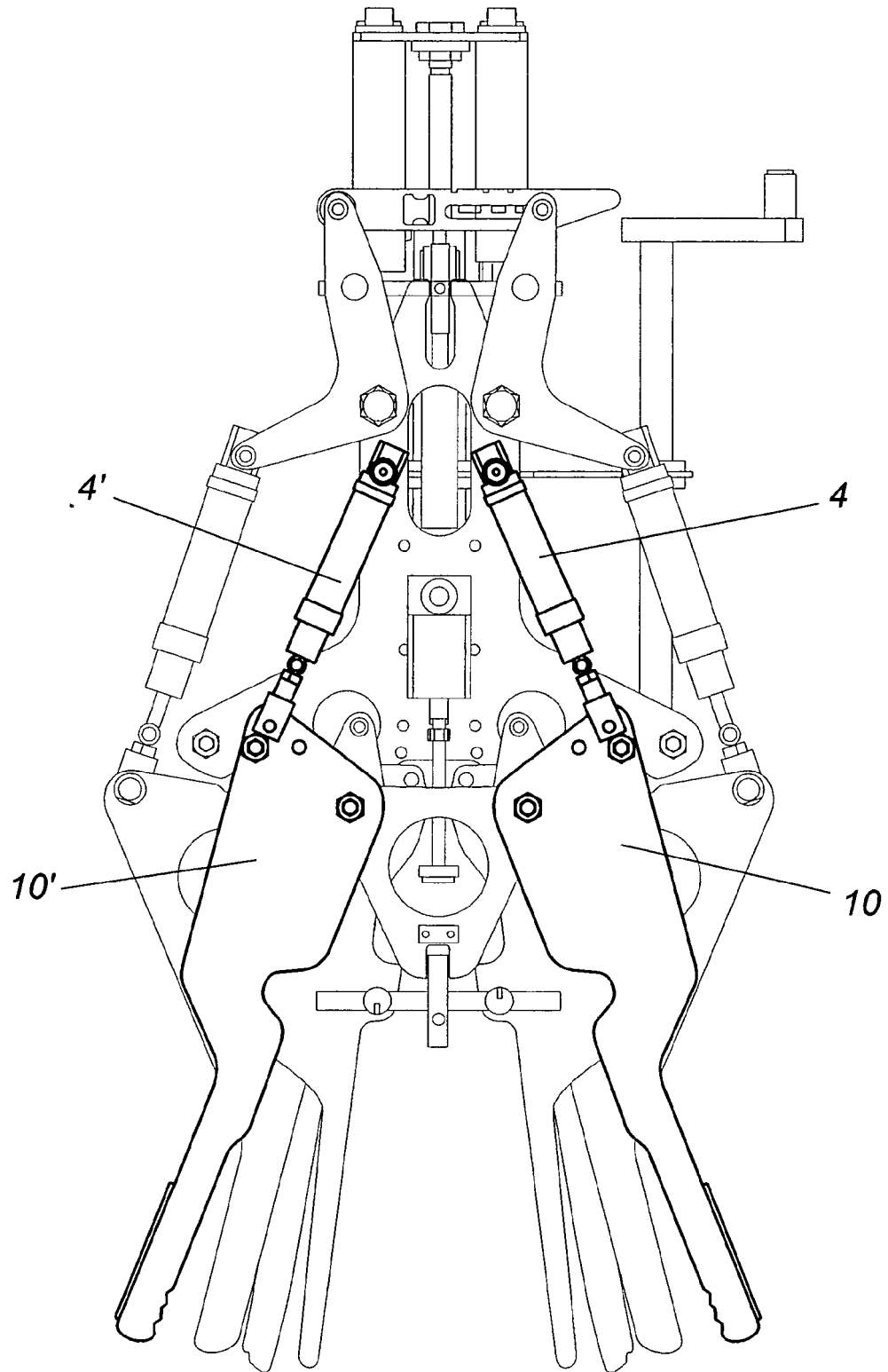


Fig. 4

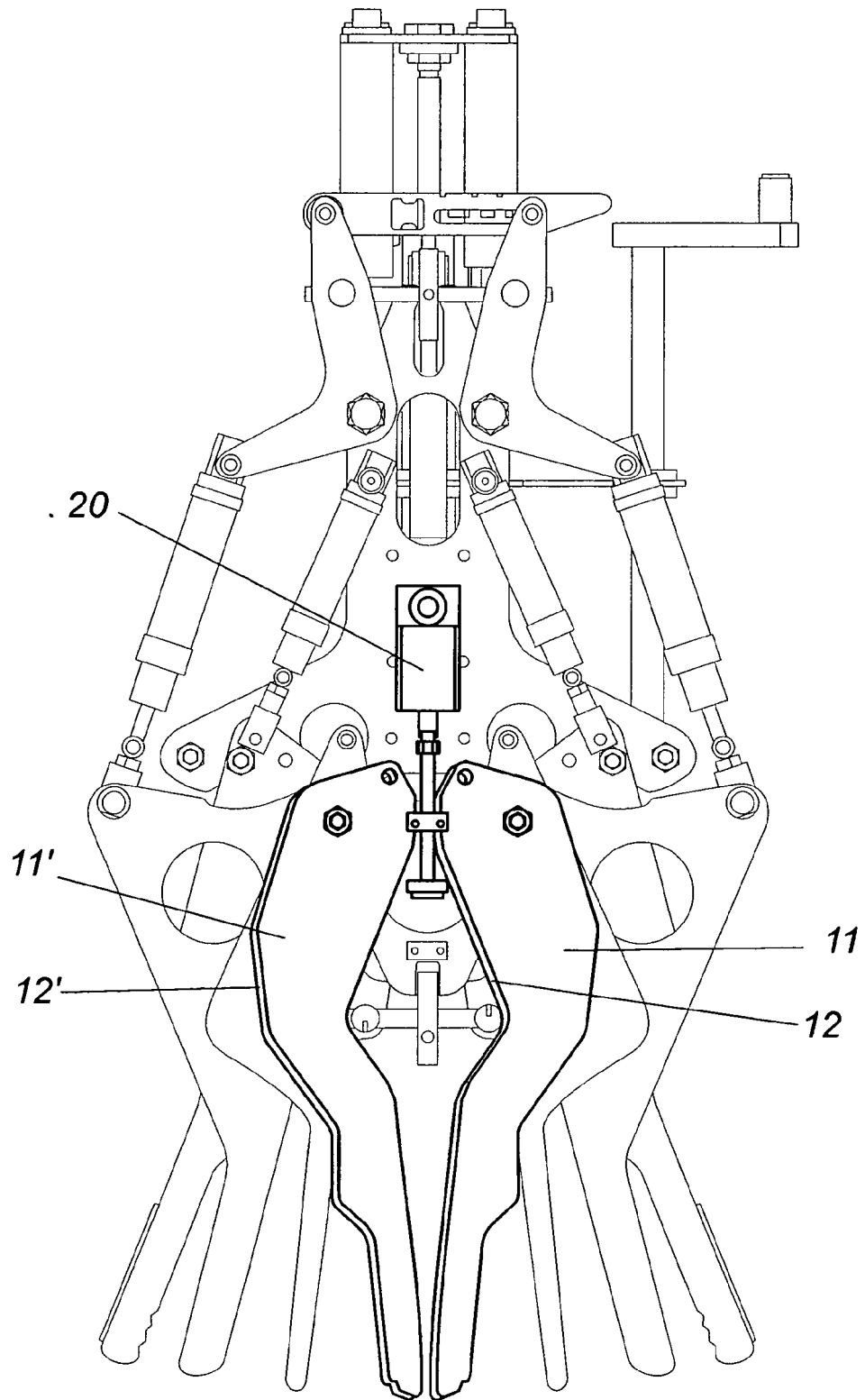


Fig. 5

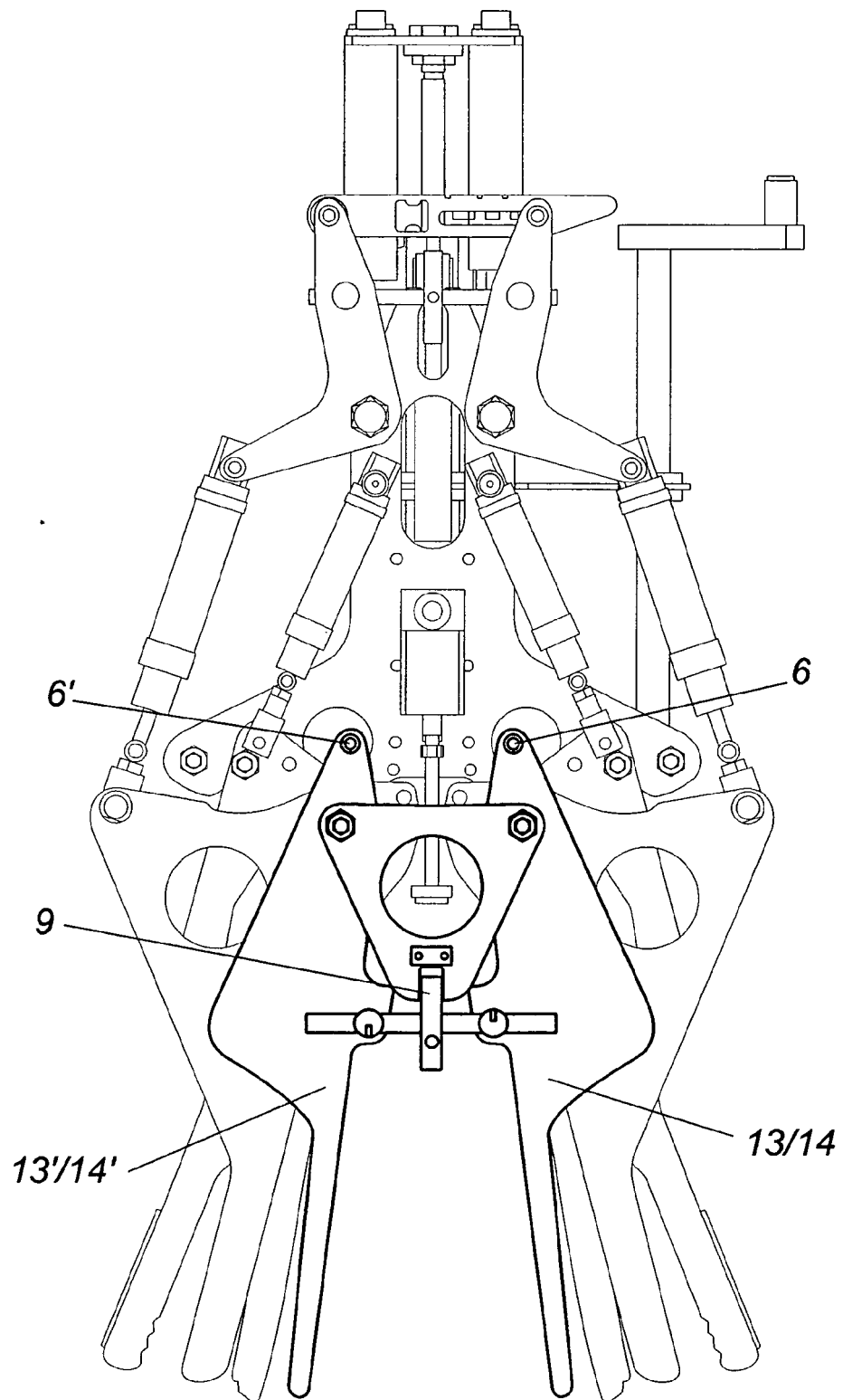


Fig. 6

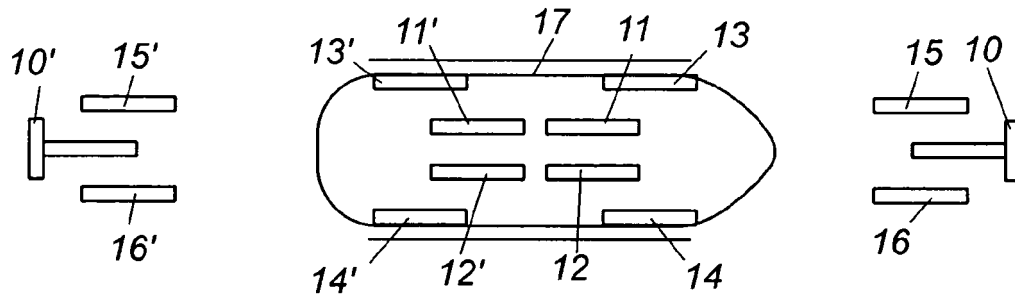


Fig. 7

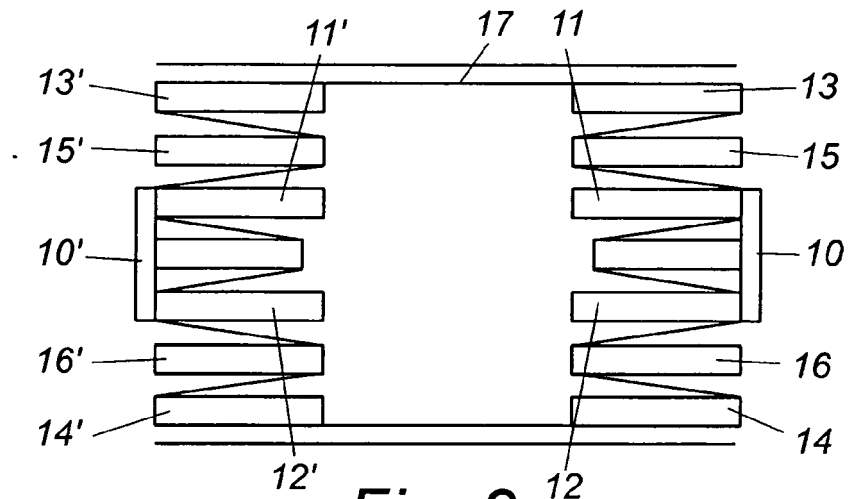


Fig. 8

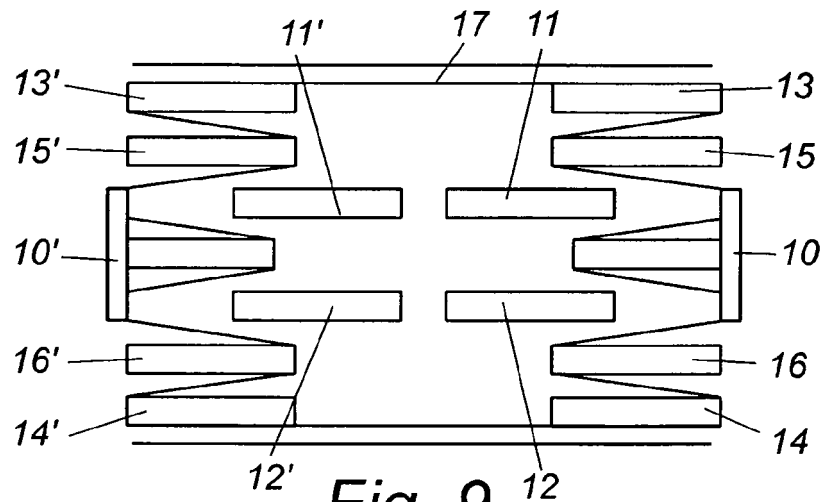


Fig. 9

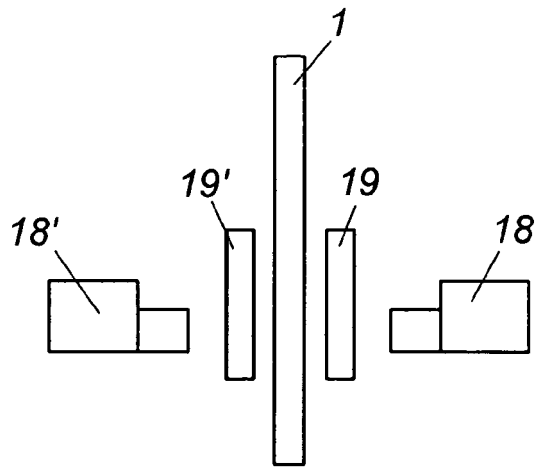


Fig. 10

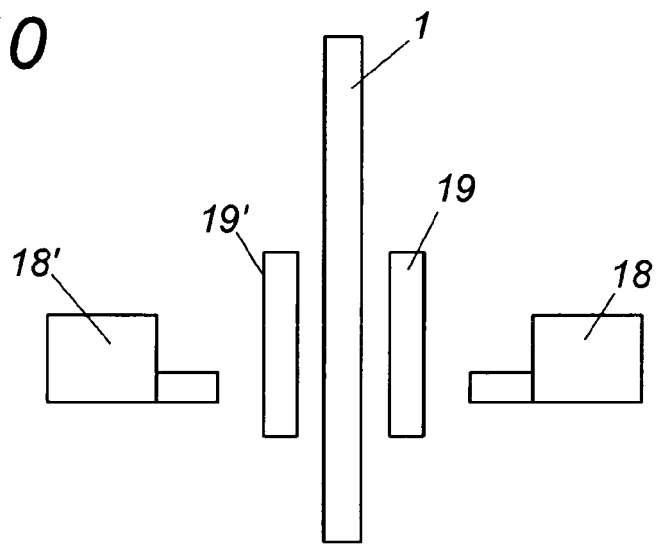


Fig. 11

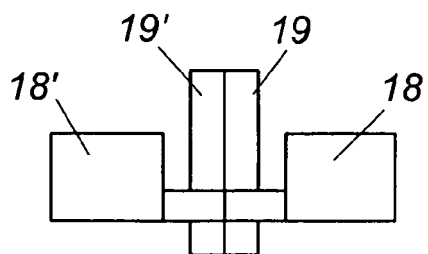


Fig. 12

REFERENCES CITED IN THE DESCRIPTION

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