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(54) Improvements in and relating to cable connector port structures

(57) A gate assembly (1) for a cable connector port structure (18, 19a, 19b) for rack-mounted data processors comprising a plurality of gate members (7) and associated sensors (30), each gate member being operatively associated with a respective sensor, and the assembly being such that, in use, the gate member is pivotable so as to be capable of adopting a closed condition in which the gate member substantially blocks a cable connector port (19a) and an open condition in which admittance to the connector port is permitted, and the sensor distinguishing between the open condition and the closed condition.

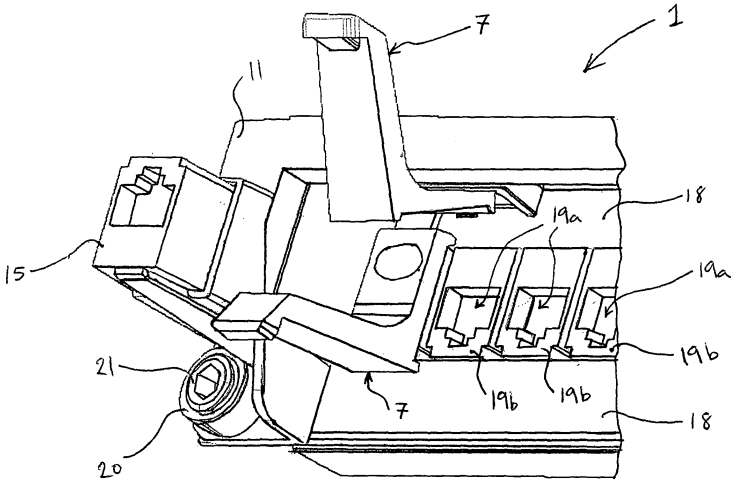

Figure 3

EP 1 796 402 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to improvements in and relating to cable connector port structures and specifically to gate assemblies for cable connector port structures. In particular, although not exclusively, the invention relates to gate assemblies that are selectively operative to cover the sockets of rack-mounted data processing assemblies.

BACKGROUND OF THE INVENTION

[0002] Network infrastructures of data processing apparatus are known which comprise multiple data processing equipment mounted on a framework provided in a cabinet or enclosure. The framework comprises two upright apertured bars to which each equipment is securidly attached. Each data processing equipment could for example be a server (eg of a server farm), telecommunications equipment (eg switching/routing equipment) or broadcast equipment. Each equipment is provided with a port connector assembly that comprises one or more rows of sockets that are each adapted to receive an electrical connector. Accordingly different equipments housed in the enclosure can be interconnected by way of a cable that is provided with a connector at each end.

[0003] A medium size server farm, for example, may comprise hundreds of port connector assemblies and it would be advantageous to monitor socket availability for the purposes of security and capacity planning, for example.

STATEMENTS OF INVENTION

[0004] According to a first aspect of the invention there is provided a gate assembly for a cable connector port structure comprising a gate member and a sensor, the gate member being operatively associated with the sensor, the assembly being such that, in use, the gate member is adapted to be capable of adopting a closed condition in which the gate member substantially blocks a cable connector port and an open condition in which admittance to the connector port is permitted, and the sensor distinguishing between the open condition and the closed condition.

[0005] The gate member is preferably pivotally mounted for movement towards and away from the cable connector port.

[0006] In the closed condition the gate member is preferably adapted to substantially prevent ingress of dust into the cable connector port. The gate member may be adapted, in use, to sealingly engage with the surface of the cable connector port structure surrounding the connector port in the closed condition.

[0007] The gate assembly is preferably removably connectable to a support structure. The gate assembly is most preferably adapted to be removably connectable to two spaced apart rack members.

[0008] The gate member is preferably adapted to require manipulation to urge the gate member from the closed condition to the open condition. The gate member may be resiliently biased towards the closed condition.

[0009] In one embodiment the gate member depends from a transverse frame member.

[0010] In a highly preferred embodiment the gate assembly comprises a plurality of gate members.

[0011] According to another aspect of the invention there is provided a connector port assembly which comprises the gate assembly of the first aspect of the invention.

[0012] According to a third aspect of the invention there is provided data processing apparatus which comprises the gate assembly of the first aspect of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Various embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a front elevation of a gate assembly, data processing equipment and a mounting assembly;

Figure 2 is a partial perspective view of the gate assembly and data processing equipment of Figure 1, in which gate members of the gate assembly are in a closed condition;

Figure 3 is a partial perspective view of the gate assembly and the data processing equipment of Figures 1 and 2 in which one of the gate members is an open condition;

Figures 4 and 5 are partial perspective views of the gate assembly and data processing equipment of Figure 3 with one of the gate members in an open condition that show snap-shots of a cable connector being inserted into a port of the data processing equipment; and

Figure 6 is a side view of a gate member and associated switch mechanism.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0014] With reference to Figure 1 there is shown a retrofit gate assembly 1 which is attached to a rack framework comprising two spaced-apart upright apertured bars 2. The gate assembly 1 is mounted in front of a connector port assembly of data processing equipment 3, which is also secured to the rack framework.

[0015] More specifically, the gate assembly 1 comprises an enclosing frame 4 comprising a transverse portion 5 and two depending limbs 6a and 6b provided at the

distal ends of the transverse limb 5. Depending from the transverse portion 11 there are provided a plurality of gate members 7 which are pivotally mounted to said transverse portion.

[0016] With reference to Figure 2, each gate member comprises a base portion 9 and a handle portion 10, the handle portion 10 being substantially perpendicular to the base portion 9. The underside of the base portion 9 is provided with a seat portion that comprises two spaced-apart limbs 13a and an intermediate portion 13b, the intermediate portion being set back from the limbs 13a.

[0017] The base portion 9 is rigidly connected to an arm portion 8, and the arm portion 8 is hingedly mounted to switch mechanism housing 12. The switch mechanism housing 12 is provided on a rearward surface of the transverse portion 11. With reference to Figure 6 a leaf spring 32 attached to the arm portion 8 and to the switch mechanism housing 12. A hinge 34 is provided that is attached to the arm 8 and to switch mechanism housing 12. A spring biased button 30 is provided in the housing 12 and is depressed when the gate member is in the closed condition (as shown) and released when the gate member is in the open condition. Accordingly the button causes an electrical connection to be made or broken. An electrical connection (not shown) is provided from each button to an electrical contact pin in the output port 15.

[0018] In use the gate assembly 1 is used as follows.

[0019] The data processing equipment 3 is secured to the upright bars 2 by way of two screw fasteners 16 which pass through apertures provided in flanges 17 which are integral with a panel 18 of the connector port assembly of the data processing equipment 3. The fasteners 16 also pass through respective apertures 26 of the upright bars 2 and are secured in position by way of nut members (not shown). The equipment 3 and the upright bars 2 are typically provided in a housing known as an enclosure or cabinet. The data processing equipment 3 may be a server, audio/visual equipment, broadcast equipment or telecommunications equipment.

[0020] It is intended to secure the gate assembly 1 in front of the connector port assembly and accordingly the gate assembly is positioned so that the base portions 9 of each of the gate members 7 are in registration with a respective connector port opening 19a of the connector port assembly. The connector port openings 19a may be adapted to receive any particular known connector type, for example the RJ-45 type or the RJ-11 type. Each of the openings 19a contains one or more electrical contacts or 'pins' adapted to be brought into connection with an electrical contact of a connector.

[0021] In that position apertures 20 provided in each limb 6a and 6b are aligned with respective apertures 26 of the upright bars 2. Fasteners 21 are then passed through the apertures 20 and the respective apertures 26 of the upright bars and nuts (not shown) are attached to the fasteners to secure the gate assembly 1 in position.

[0022] As best seen in Figure 2 the limbs 13a engage with the surface of the panel 18 and so maintain a spaced-relationship between the intermediate portion 13b and the respective connector port body 19b to ensure a suitable spacing, for example a spacing of a few millimetres. Such a spacing ensures that in a closed condition as shown in Figures 1 and 2, dust is substantially prevented from entering into any of the connector port openings 19a.

[0023] A connector (not shown) is inserted into the output port 15, and the cable connected to the connector conveys data to gate monitoring apparatus (not shown) that comprises a data processor and is operative to monitor the status of each of the gate members 7.

[0024] Should it be required to use any of the connector port openings 19a, a user is required to grip the handle portion 10 of the respective gate member and pull the gate member outwardly and against the resilient action of the arm portion 8, and so expose the associated underlying connector port opening 19a. Figure 3 shows a gate member 7 in the open condition.

[0025] With the gate member 7 in the open condition a user then inserts a connector 23 connected to cable 24 towards and into the connector port 19, as shown in Figures 4 and 5.

[0026] As a result of creation/breaking of an electrical connection in the associated button 30 a signal is sent through a respective pin of the output to the monitoring apparatus that is indicative of a particular gate member being opened. The gate monitoring apparatus then stores in a log a note of the fact that the particular gate member 7 is in an open condition. By the same token, the gate monitoring apparatus is also aware of the status of the other gate members 7. Accordingly the gate monitoring apparatus is aware of which connector ports are occupied and which ones are not.

[0027] Although implementation is described above with regard to rack-mountable data processing apparatus, the gate assembly may be used with a rack-mountable connector port assembly, that is provided with one or more sockets, and each of the sockets being connected to remote signal receiving and/or emitting equipment by way of a wired or wireless connection. Such a rack-mountable patch panel provides connectivity to one or more remotely located equipments in a wire and/or wireless manner.

[0028] The intermediate portions 13 of base portions 9 of the gate members 7 are described and shown above as being spaced from the respective connector port in the closed condition. However, in an alternative embodiment the base portion of the gate member is adapted to sealingly engage with the connector port body 19b in the closed condition so as to substantially enclose the connector port opening 19a. Such an alternative embodiment may be realised by the provision of a resilient pad (made for example of a suitable rubber foam material) on the base portion. Such an alternative embodiment would, in the closed condition, completely prevent ingress of dust into the connector port opening.

[0029] In an alternative embodiment one or more of the gate members may be slidably-mounted and is adapt-

ed to be slidable from a closed condition to an open condition and vice versa, and so form a movable barrier.

[0030] In alternative embodiments the relative positioning/configuration of the gate members is altered in conformity with different connector port configurations (eg spaced-apart groups of adjacent connector ports).

[0031] Although reference is made above to electrical cable/connectors, the gate assembly 1 may be used with optical cable/connectors.

[0032] Advantageously since the ingress of dust into the port openings is substantially prevented, the electrical contacts within the port openings are maintained substantially dust-free and so avoiding deterioration of the quality of electrical connection between the electrically conductive portions of a connector and the electrically conductive portions of the connector port.

[0033] The gate assembly 1 can be installed on a connector port structure without the need to remove any connectors that are already plugged into the sockets of the patch panel. In this way installation of the gate assembly does not cause any operational issue (such as disconnecting the connectors). Furthermore no special connectors/cables need be used.

[0034] Although the switch mechanisms 12 are shown as being provided with respective mechanical switches 30, in alternative embodiments other sensor types are embodiment to sense a change of state of each gate member, for example a proximity sensor comprising a light sensitive region.

Claims

1. A gate assembly (1) for a cable connector port structure (18, 19a, 19b) comprising a gate member (7) and a sensor (30), the gate member being operatively associated with the sensor, the assembly being such that, in use, the gate member is adapted to be capable of adopting a closed condition in which the gate member substantially blocks a cable connector port (19a) and an open condition in which admittance to the connector port is permitted, and the sensor distinguishing between the open condition and the closed condition.

2. A gate assembly as claimed in claim 1 in which the gate member (7) is pivotally mounted for movement towards and away from the cable connector port (19a).

3. A gate assembly as claimed in claim 1 or claim 2 in which in the closed condition the gate member (7) is adapted to substantially prevent ingress of dust into the cable connector port (19a).

4. A gate assembly as claimed in claim 3 in which the gate member (7) is adapted, in use, to sealingly engage with the surface (18) of the cable connector port structure surrounding the connector port (19a) in the closed condition.

5. A gate assembly as claimed in any preceding claim which is removably connectable to a support structure (2).

6. A gate assembly as claimed in claim 5 which is adapted to be removably connectable to two spaced apart rack members (2).

7. A gate assembly as claimed in any preceding claim which is adapted to require manipulation to urge the gate member (7) from the closed condition to the open condition.

8. A gate assembly as claimed in any preceding claim in which the gate member (7) is resiliently biased towards the closed condition.

9. A gate assembly as claimed in any preceding claim in which the gate member (7) depends from a transverse frame member (11).

10. A connector port assembly which comprises the gate assembly (1) of any of claims 1 to 9.

11. Data processing apparatus which comprises the gate assembly (1) of any of claims 1 to 9.

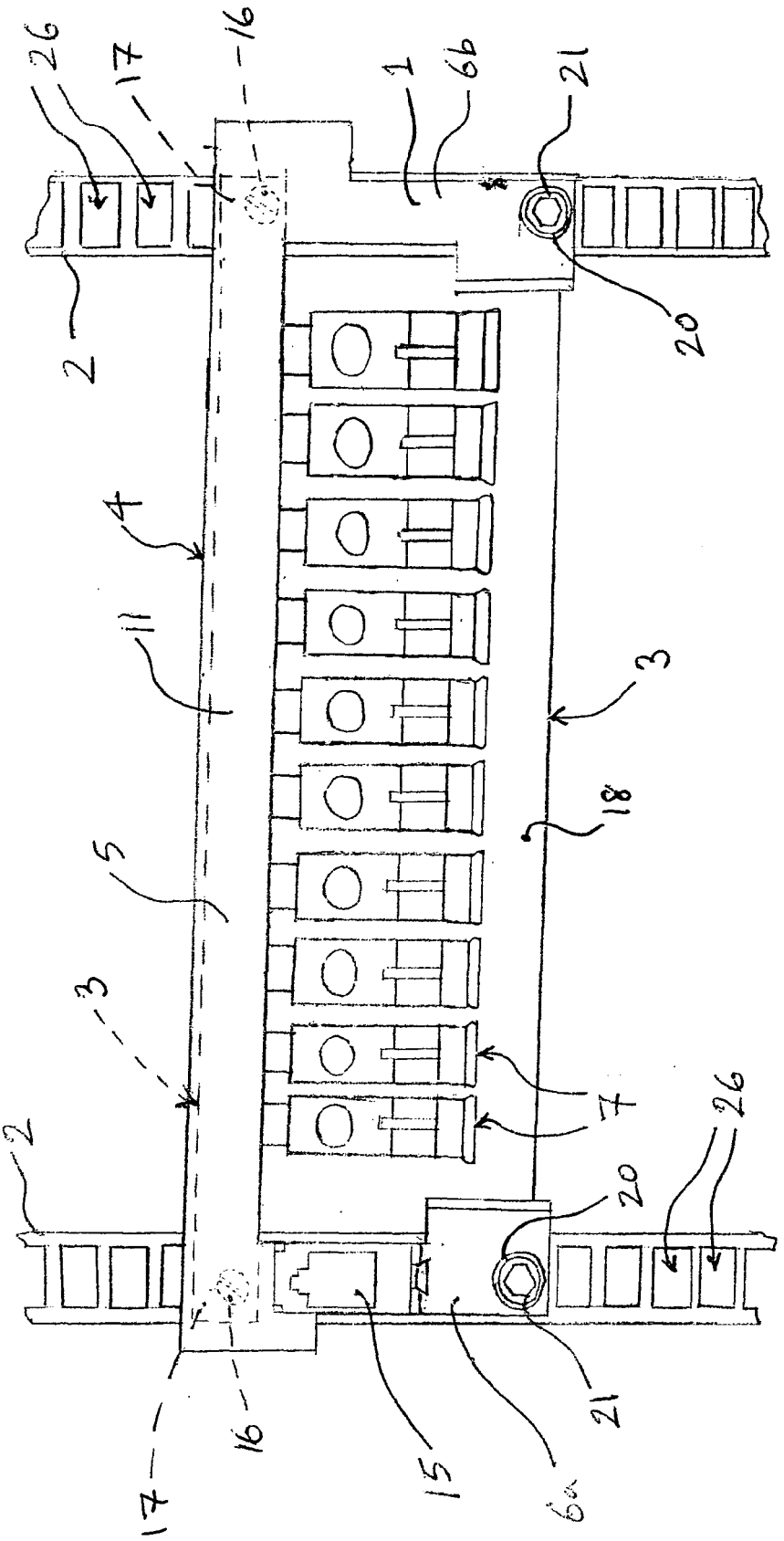

Figure 1

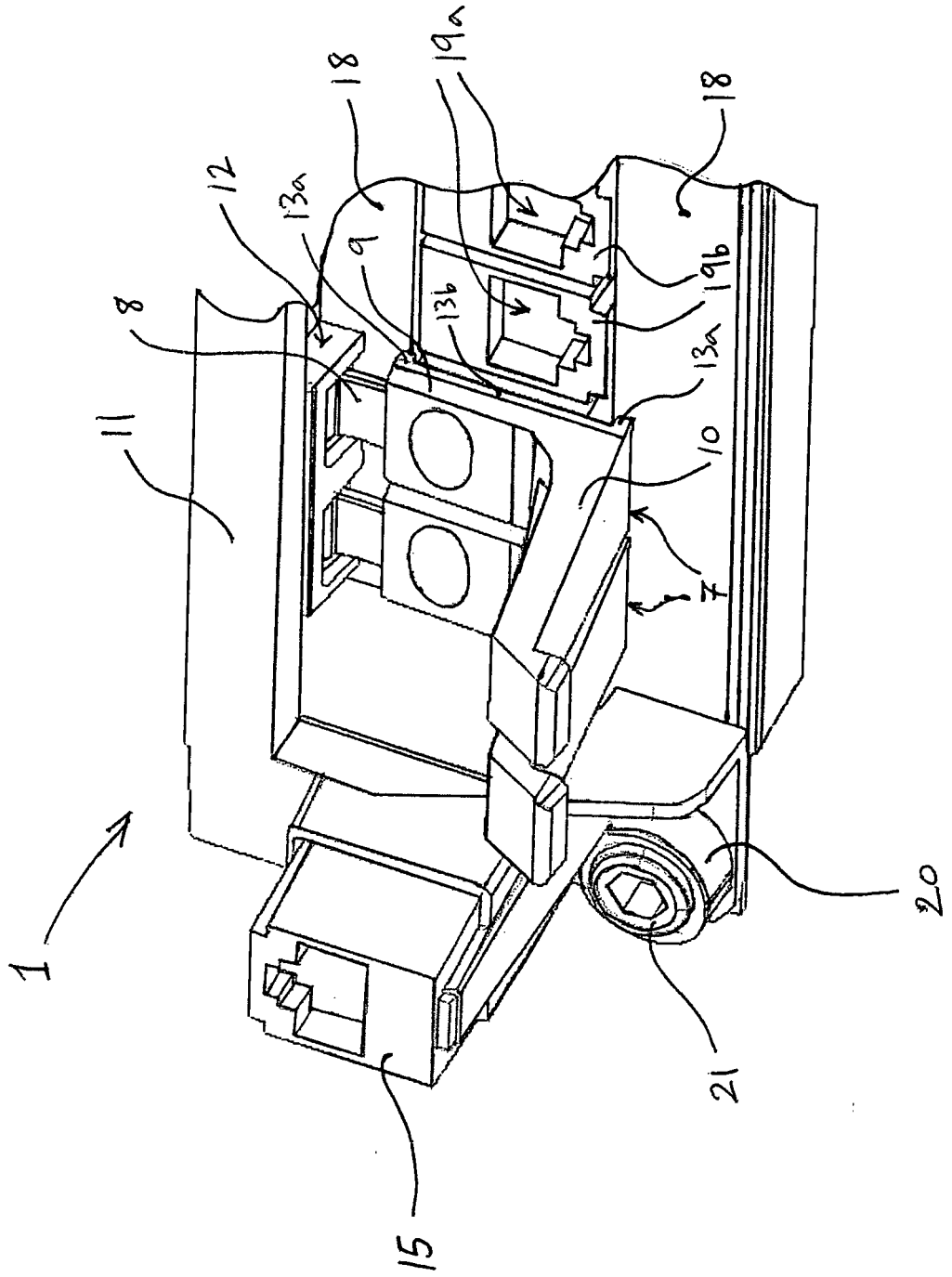

Figure 2

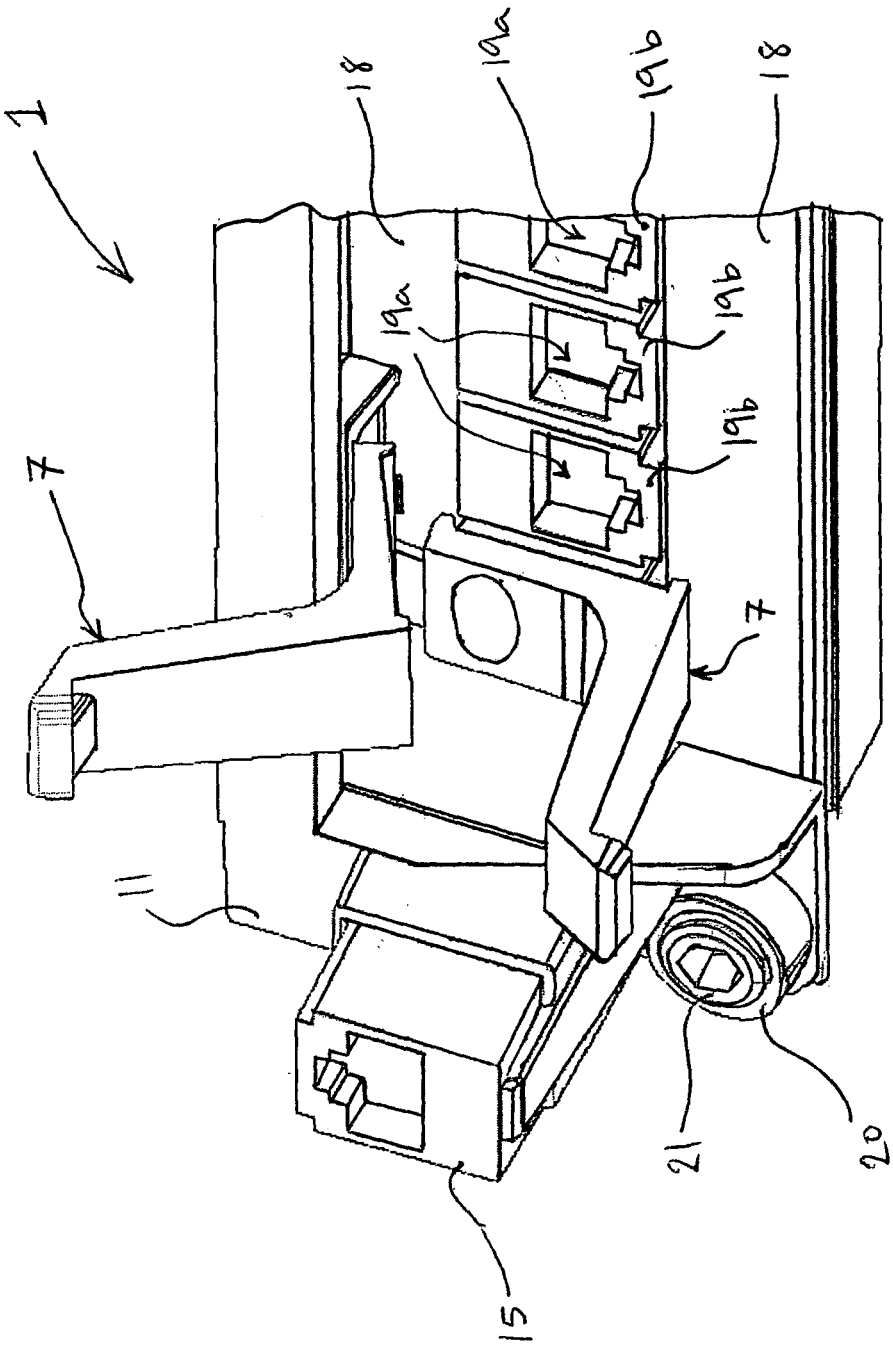

Figure 3

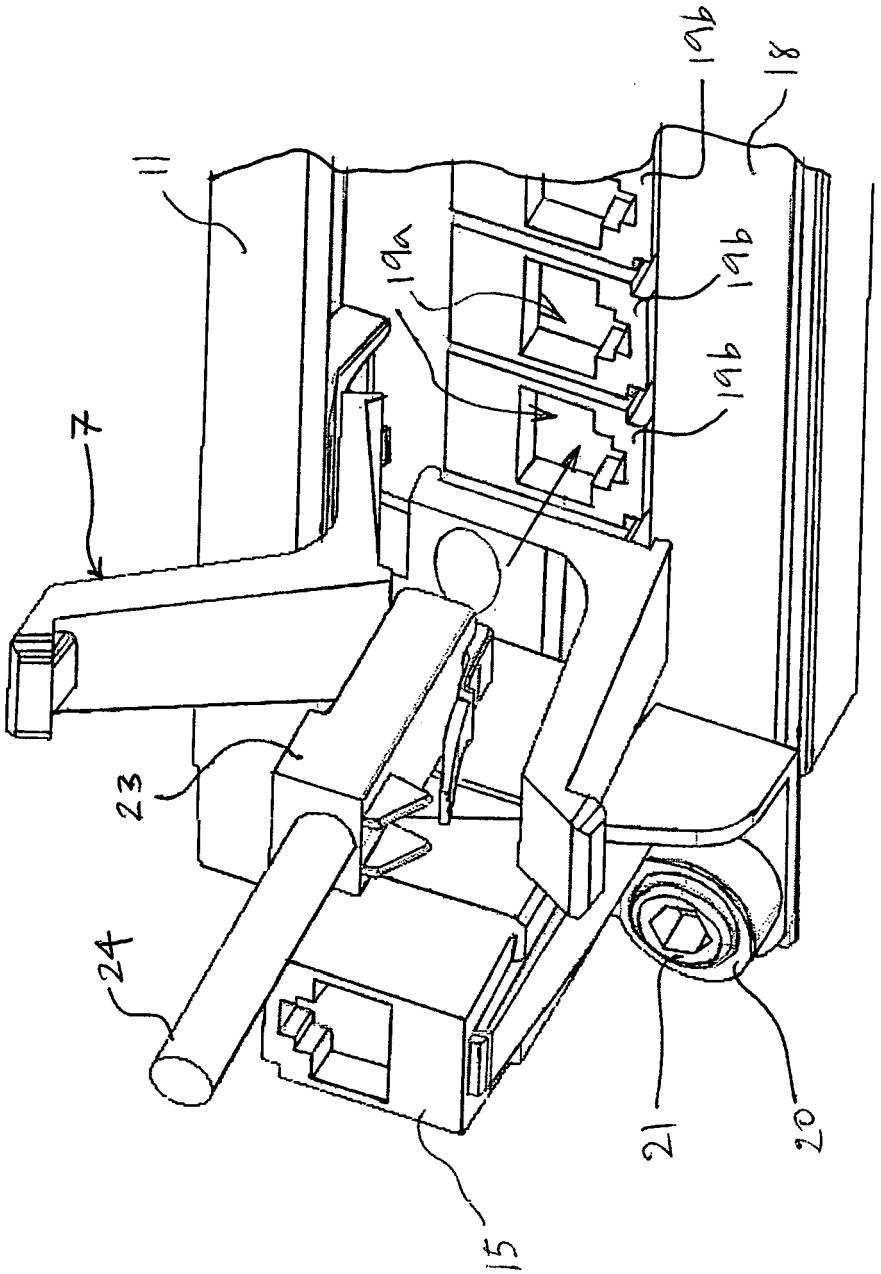

Figure 4

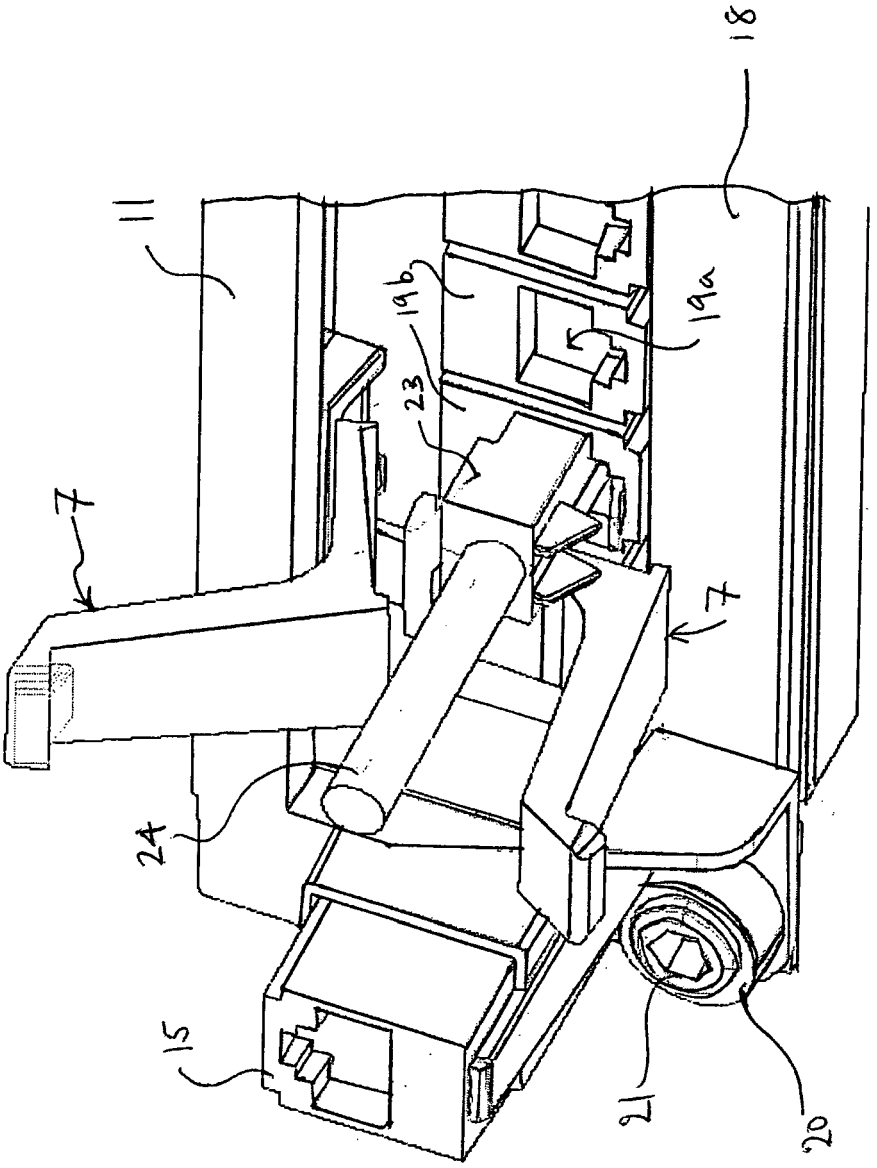

Figure 5

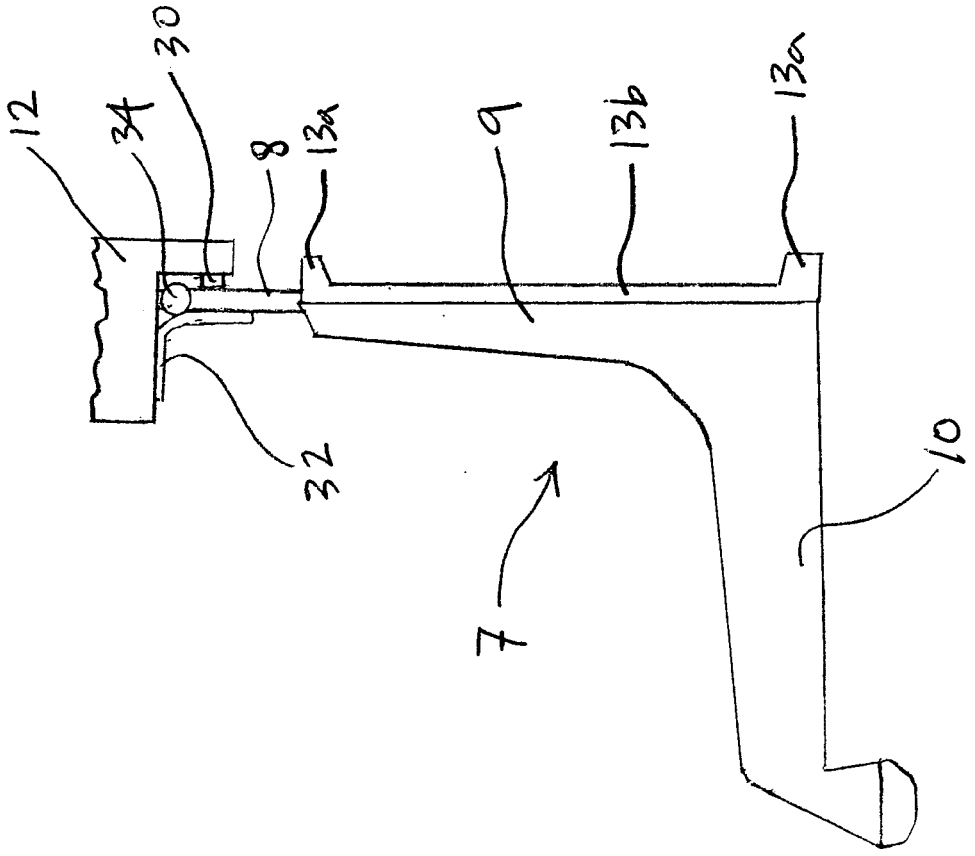

Figure 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 02 5308

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 April 2007	Chelbosu, Liviu

CATEGORY OF CITED DOCUMENTS

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