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(54) Title: CONTAINER DEVICE FOR A MOTOR VEHICLE, MOTOR VEHICLE WITH A CONTAINER DEVICE AND
METHOD FOR OPERATING A CONTAINER DEVICE

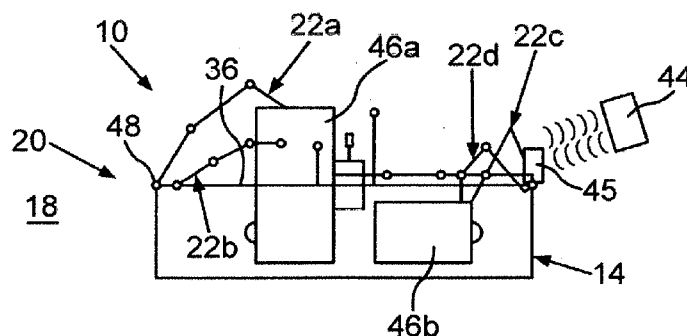


Fig.5

(57) Abstract: The invention relates to a container device (10) for a motor vehicle (12), the container device (10) comprising a container housing (14) for delimiting a cargo space (16) and the container device (10) comprising a lifting device (20) for moving cargo (46a, 46b) between the surroundings (18) of the container device (10) and the cargo space (16). The lifting device (20) comprises at least two lifting arms (22a, 22b) between which the cargo (46a, 46b) is clampable for moving the cargo (46a, 46b) between the surroundings (18) and the cargo space (16).



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Document US 5803699 discloses an apparatus and a method for loading a container onto a trailer for transport by a vehicle and for unloading the container from the trailer. The trailer includes a frame mounted on to rear axles, a lift device and front and rear securing pads. An adjustable and removable spider is connected to the lift device and connects to the front end of the container to allow the lift device to move the container onto the trailer. To load

the container, the spider is adjusted to the correct height by adjusting the length of the side members.

5 It is the object of the present invention to provide a container device for a motor vehicle and a method for operating a container device, which allow for improved loading and unloading cargo.

10 This object is solved by a container device for a motor vehicle as well as by a method for operating a container device for a motor vehicle having the features of the independent claims as well as by a motor vehicle with a container device. Advantageous embodiments of the invention are specified in the dependent claims.

15 The container device for a motor vehicle comprises a container housing for delimiting a cargo space and a lifting device for moving a cargo between the surroundings of the container device and the cargo space.

20 According to the invention, the lifting device comprises at least two lifting arms between which the cargo is clampable for moving the cargo between the surroundings and the cargo space.

25 The at least two lifting arms may be arranged in a distance between each other and may be mounted on the container housing. By clamping the cargo between the two lifting arms, even unhandy cargo, which has a big size can be picked securely and moved between the surroundings and the cargo space without the need for additionally securing the cargo during its movement e.g. by means of clamping means or lifting hooks. Thus, in contrast to e.g. a gripper with a single lifting arm, the lifting device with at least two lifting arms for clamping the cargo allows for improved loading and unloading the
30 cargo.

35 An advantageous embodiment of the invention provides that at least one of the lifting arms comprises a first arm member at least a second arm member which is pivotably connected with the first arm member. In other words, at least one of the lifting arms is designed as a multi-part lifting arm. This is of advantage, because a multi-part lifting arm provides for more degrees of freedom related to the movability in dependency on the number of single parts of the respective lifting arm.

An advantageous embodiment of the invention provides that at least one of the arm members is telescopable. This allows for picking up cargo even if the cargo is situated in a greater distance to the container device.

- 5 In a further advantageous development of the invention, the second arm member is pivotable into a stowed position, in which the arm members are parallel with each other and in which the second arm member is situated in an opening of the first arm member. In the stowed position the second arm member is inserted into the opening of the first arm member and thus the
10 second arm member is nested within the first arm member. In the stowed position, the arm members are arranged in an especially space saving manner.

- According to a further advantageous embodiment of the invention, it is provided that at least one of the lifting arms is pivotably mounted at a sill of the
15 container housing, the sill delimiting a boundary between the cargo space and the surroundings. Mounting the lifting arm at the sill of the container housing has several advantages. One advantage is, that the lifting arm is then mounted at the edge of the container housing and thus the container
20 housing hardly encumbers the movement of the lifting arm. Another advantage is that the lifting arm can also be mounted translatable movable along the sill and thus by means of the lifting arms cargo, which is situated on different sides of the container housing can be easily lifted.

- 25 According to a further advantageous embodiment of the invention, it is provided that the lifting device comprises at least one flexible supporting element, which is connected with both lifting arms. The flexible supporting element can be designed e.g. as a rubber band which may be used for keeping the cargo within the cargo space. In other words, by means of the flexible
30 supporting element, the cargo can be kept in position within the cargo space by means of the lifting arms of the lifting device.

- A further advantageous embodiment of the invention provides that the container device comprises at least one camera for observing the surroundings
35 of the container device and/or for observing the cargo space. By means of the camera an operating personnel of the container device can easily check, whether there is still cargo within the cargo space, wherein it is clear, that the container device comprises means for displaying the pictures taken by the camera.

The motor vehicle according to the invention includes a container device according to the invention or an advantageous embodiment of the container device according to the invention.

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In the method according to the invention for operating a container device, the container device comprises a container housing for delimiting a cargo space of a container device and the container device comprises a lifting device which is used for moving cargo between the surroundings of the container device and the cargo space. At least one lifting arm of the lifting device is operated by means of a remote control device, and another lifting arm of the lifting device is adjusted automatically in dependency on the operation of the at least one lifting arm, and cargo is clamped between the lifting arms for moving the cargo between the surroundings and the cargo space. This allows for an especially ergonomic movement of the cargo between the surroundings of the container device and the cargo space and thus unburdens the operating personnel of the container device. Advantageous developments of the container device according to the invention are to be considered as advantageous developments of the method according to the invention and vice versa.

Further advantages, features and details of the invention are apparent from the following description of a preferred embodiment as well as based on the drawing. The features and feature combinations mentioned above in the description as well as the features and feature combinations mentioned below in the description of figures and/or shown in the figures alone are usable not only in the respective specified combination, but also in other combinations or alone without departing from the scope of the invention.

30 The drawings show in:

Fig. 1a a side view on an embodiment of a container device according to the invention, wherein the container device is mounted on a roof of a motor vehicle;

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Fig. 1b a top view on the container device shown in fig. 1a;

Fig. 2a a side view on an embodiment of the container device, wherein the container device comprises flexible support-

ing elements for keeping cargo, which is deposited in a cargo space of a container housing of the container device in position;

5 Fig. 2b a top view on the embodiment of the container device shown in fig. 2a;

Fig. 3a to fig 3d a side view on a first lifting arm of the container device, wherein the first lifting arm is shown in different positions;

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Fig. 4 a front view of the first lifting arm, wherein different arm members of the first lifting arm are in a stowed position;

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Fig. 5 another side view on the container device, wherein cargo is clamped between the first lifting arm and a second lifting arm of a lifting device of the container device and wherein the movement of the lifting arms is steered by means of a remote control device;

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Fig. 6a another side view on the container device, wherein the lifting device is in a covering position in which the lifting device prevents cargo from falling out of the cargo space of the container housing; and in

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Fig. 6b another side view on the container device, wherein the first lifting arm of the lifting device is equipped with a camera.

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In the figures the same elements or elements having the same functions are designated with the same reference signs.

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Fig. 1a shows a container device 10, which is mounted on a roof top of a motor vehicle 12. The container device 10 comprises a container housing 14 which delimits a cargo space 16. The cargo space 16 can be used in order to stow cargo 46a, 46b. The container device 10 also comprises a lifting device 20 for moving the cargo 46a, 46b between the surroundings 18 of the container device 10 and the cargo space 16. In fig. 1a, the lifting device 20 comprises two lifting arms 22a, 22b between which the cargo 46a, 46b is clampable for moving the cargo 46a, 46b between the surroundings 18 and

the cargo space 16. The first lifting arm 22a and the second lifting arm 22b can be mounted on different mounting positions 21, which are shown in fig. 1b, as well as further lifting arms such as a third lifting arm 22c and a fourth lifting arm 22d. The third lifting arm 22c and the fourth lifting arm 22d are not shown in fig. 1a and fig. 1b but e.g. in fig. 2a and fig. 2b. Altogether, eight different lifting arms, which are identical in construction, can be mounted on the container housing 14 at the different mounting positions 21. The lifting arms 22a, 22b each comprise a first arm member 24a, a second arm member 24b and a third arm member 24c. In other words, the lifting arms 22a, 22b are each designed as a multi-part lifting arm. The arm members 24a, 24b, 24c are pivotably connected with each other. This allows for an especially high movability of the lifting arms 22a, 22b. The movability of the lifting arms 22a, 22b is further increased due to the fact that at least one of the arm members 24a, 24b, 24c is telescopable. It is clear, that the movability of the lifting arms 22a, 22b can be further increased by increasing the number of the arm members 24a, 24b, 24c. The lifting arms 22a, 22b are pivotably mounted at a sill 36 of the container housing 14. The sill 36 delimits a boundary 38 between the cargo space 16 and the surroundings 18.

Fig. 2a and fig. 2b show, that the lifting device 20 may also comprise at least one flexible supporting element 40, which is e.g. designed as a rubber band. By means of the flexible supporting element 40 the lifting arms 22a, 22b may be connected with each other in order to provide a flexible load securing when moving the cargo 46a, 46b, which is clampable between the two lifting arms 22a, 22b. In fig. 2a and fig. 2b, one can see that the lifting device 20 comprises a plurality of flexible supporting elements 40, by means of which the different lifting arms 22a, 22b, 22c, 22d are netlike connected with each other.

Fig. 3a to fig. 3d show the movability of the first lifting arm 22a with its three arm members 24a, 24b, 24c.

Fig. 4 shows, that the second arm member 24b and the third arm member 24c are both pivotable into a stowed position 32, in which the arm members 24a, 24b, 24c are parallel with each other and in which the second arm member 24b and the third arm member 24c are both situated in an opening 34 of the first arm member 24a. In other words, when looking at the lifting arm 22a according to a viewing direction V, one can only see the first arm member 24a, if the arm members 24a, 24b, 24c are in the stowed position

32, since in the stowed position 32 the first arm member 24a covers the second arm member 24b and the third arm member 24c from the view according to the viewing direction V. Fig. 4 also shows, that the first lifting arm 22a (and the other lifting arms 22b, 22c, 22d) is (are) pivotably and translatable movable connected to the sill 36 of the container housing 14 by means of a support 48. The support 48 allows for a rotary motion of the first lifting arm 22a according to different pivoting directions 50a, 50b. Furthermore, the support 48 allows for a translatable movement 56 of the first lifting arm 22a along the sill 36 of the container housing 14. In order to move the first lifting arm 22a according to the pivoting directions 50a, 50b and according to the translatable movement 56, the lifting arm 22a comprises at least one actuator 58, which may be steered by means of a remote control device 44, which is shown in fig. 5.

Fig. 5 shows, that the container device 10 comprises a control unit 45 for communicating with the remote control device 44. The control unit 45 adjusts the actuator 58 of each of the lifting arms 22a, 22b, 22c, 22d according to respective signals received from the remote control device 44. In order to move the cargo 46a, 46b from the container housing 14 into the surrounding 18 or vice versa e.g. the lifting arm 22a of the lifting device 20 is operated by means of the remote control device 44. The remote control device 44 can be designed e.g. as a mobile phone, wherein an app (application software) of the mobile phone can be used to operate the first lifting arm 22a. The second lifting arm 22b can be adjusted automatically by means of the control unit 45 in dependency on the operation of the first lifting arm 22a. This means, that the first lifting arm 22a may be directly steered by means of operating personnel via the remote control device 44 and the movement of the second lifting arm 22b is adapted to the manually steered movement of the first lifting arm 22a. Alternatively, the lifting arms 22a, 22b, 22c, 22d can also be automatically operated, wherein the operating personal uses the remote control device 44 to transmit signal corresponding to an order of unloading or loading the cargo 46a, 46b automatically. As a consequence the cargo 46a is clamped between the first lifting arm 22a and the second lifting arm 22b and the cargo 46b is clamped between the third lifting arm 22c and the fourth lifting arm 22d, as it is shown in fig. 5. The container device 10 then automatically loads or unloads the cargo 46a, 46b, by using the lifting arms 22a, 22b, 22c, 22d.

Fig. 6a shows, that the lifting device 20 is also moveable into a covering position 60, in which the lifting arms 22a, 22b, 22c, 22d at least partially cover the cargo 46a, 46b and thus prevent the cargo 46a, 46b from falling out of the container housing 14 or the cargo space 16, respectively. In the covering position 60, the third arm members of the lifting arms 22a, 22b, 22c, 22d are in contact with each other. In other words, in the covering position 60, the free ends of the lifting arms 22a, 22b, 22c, 22d are in contact with each other.

Fig. 6b shows, that each of the lifting arms 22a, 22b, 22c, 22d can comprise a clamping pad 62, which is arranged at each free end of the respective third arm member 24c. Furthermore, at the free end of the respective arm member 24c, each of the lifting arms 22a, 22b, 22c, 22d can comprise a sensor 64 by means of which a clamping force for clamping the cargo 46a, 46b can be determined and adjusted e.g. by means of the respective actuator 58 of each of the lifting arms 22a, 22b, 22c, 22d. Fig. 6b also shows, that the container device 10 comprises at least one camera 42 for observing the surroundings 18 of the container device 10 and additionally or alternatively for observing the cargo space 16. In the embodiment shown in fig. 6b, the camera 42 is mounted on the second arm member 24b of the first lifting arm 22a. It is clear, that the camera 42 or a plurality of cameras 42 can be mounted on different positions on the container device 10.

By means of the container device 10, an especially safe mechanic fixing device is provided in order to fix luggage, such as the cargo 46a, 46b. Since the lifting device 20 may be moved into the covering position 60, a fast fixing system is provided which is not only usable for loading or unloading the cargo 46a, 46b but also for securing the cargo 46a, 46b in the container housing 14. The container housing 14 can e.g. be designed as a roof top box with e.g. eight different lifting arms, although only four lifting arms 22a, 22b, 22c, 22d are used in the described embodiment. The lifting arms 22a, 22b, 22c, 22d and their gears (arm members 24a, 24b, 24c) can be moved and fixed by e.g. an electro hydraulic pressure system inside the roof top box, wherein this electric hydraulic pressure system is illustrated by means of the respective actuators 58.

CLAIMS:

1. Container device (10) for a motor vehicle (12), the container device (10) comprising
 - 5 – a container housing (14) for delimiting a cargo space (16) and
 - a lifting device (20) for moving cargo (46a, 46b) between the surroundings (18) of the container device (10) and the cargo space (16),characterized by
 - 10 the lifting device (20) comprising at least two lifting arms (22a, 22b) between which the cargo (46a, 46b) is clampable for moving the cargo (46a, 46b) between the surroundings (18) and the cargo space (16).
2. Container device (10) according to claim 1,
 - 15 characterized by
 - at least one of the lifting arms (22a, 22b) comprising a first arm member (24a) and at least a second arm member (24b) which is pivotably connected with the first arm member (24a).
3. Container device (10) according to claim 2,
 - 20 characterized by
 - at least one of the arm members (24a, 24b) being telescopable.
4. Container device (10) according to claim 2 or 3,
 - 25 characterized by
 - the second arm member (24b) being pivotable into a stowed position (32), in which the arm members (24a, 24b) are parallel with each other and in which the second arm member (24b) is situated in an opening (34) of the first arm member (24a).
5. Container device (10) according to any one of the preceding claims,
 - 30 characterized by
 - at least one of the lifting arms (22a, 22b) being pivotably mounted at a sill (36) of the container housing (14), the sill (36) delimiting a boundary (38)
 - 35 between the cargo space (16) and the surroundings (18).
6. Container device (10) according to any one of the preceding claims,
 - characterized by
 - the lifting device (20) comprising at least one flexible supporting element

(40), which is connected with both lifting arms (22a, 22b).

7. Container device (10) according to any one of the preceding claims,
characterized by
5 the container device (10) comprising at least one camera (42) for observing the surroundings (18) of the container device (10) and/or for observing the cargo space (16).
8. Motor vehicle (12) with a container device (10) according to any one of
10 claims 1 to 7.
9. Method for operating a container device (10), the container device (10)
comprising a container housing (14) for delimiting a cargo space (16) of
the container device (10) and the container device (10) comprising a lift-
15 ing device (20) which is used for moving cargo (46a, 46b) between the
surroundings (18) of the container device (10) and the cargo space (16),
characterized by the steps of
 - operating at least one lifting arm (22a) of the lifting device (20) by
means of a remote control device (44),
 - 20 – adjusting another lifting arm (22b) of the lifting device (20) auto-
matically in dependency on the operation of the at least one lifting
arm (22a), and
 - clamping cargo (46a, 46b) between the lifting arms (22a, 22b) for
moving the cargo (46a, 46b) between the surroundings (18) and
25 the cargo space (16).

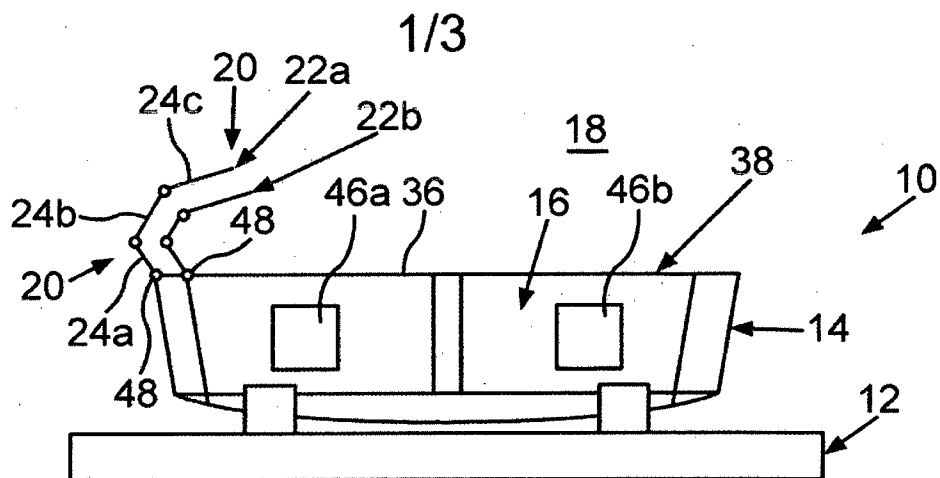


Fig. 1a

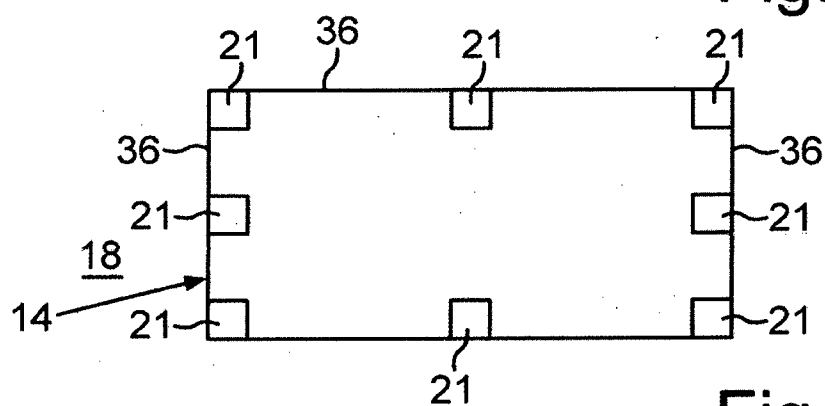


Fig. 1b

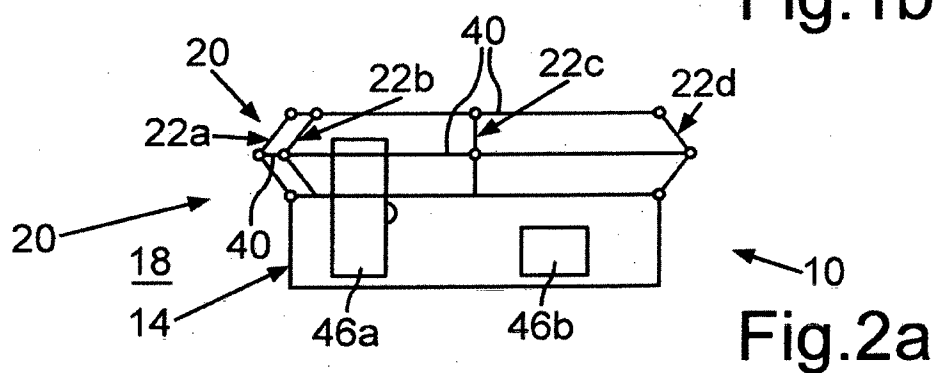


Fig. 2a

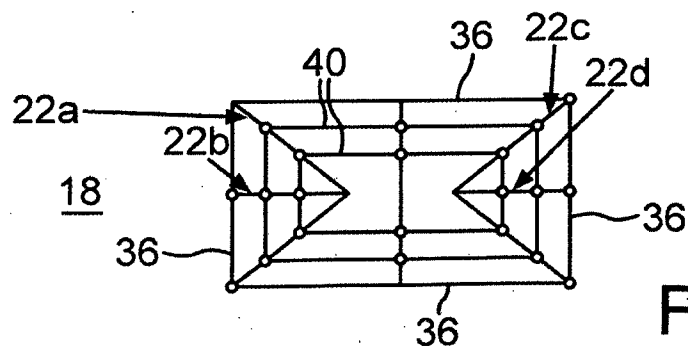


Fig. 2b

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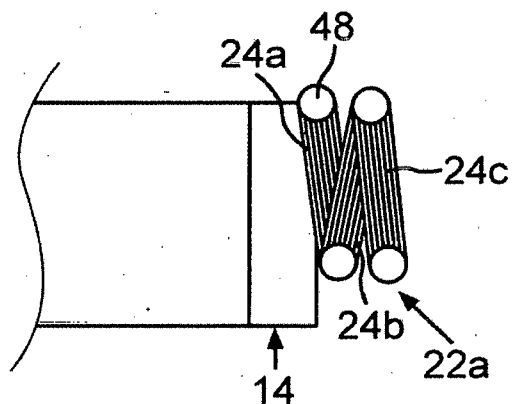


Fig. 3a

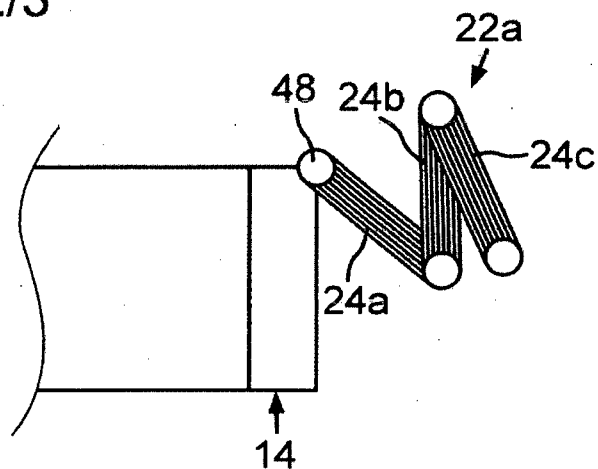


Fig. 3b

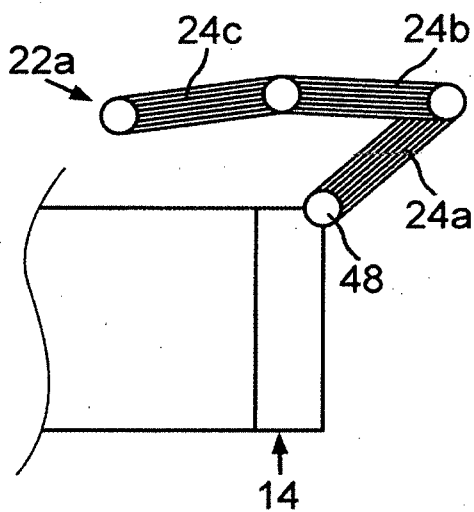


Fig. 3c

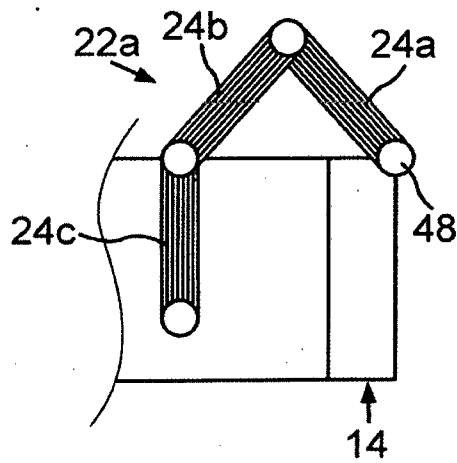


Fig. 3d

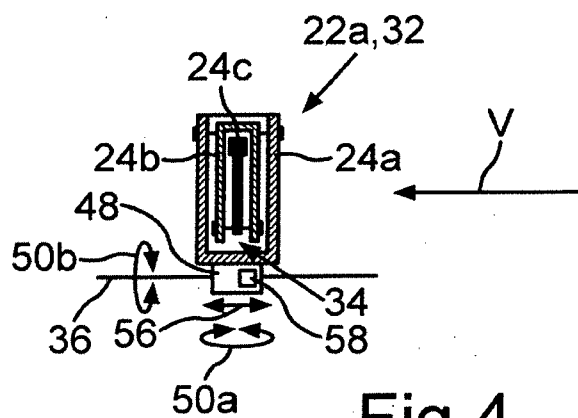


Fig. 4

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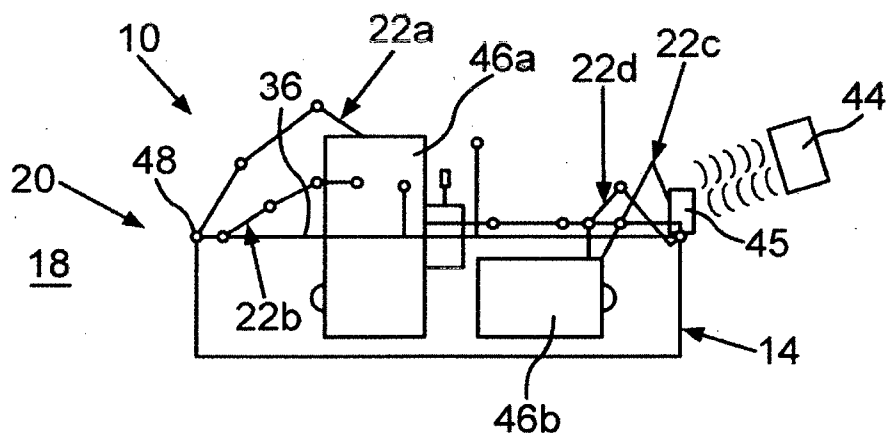


Fig. 5

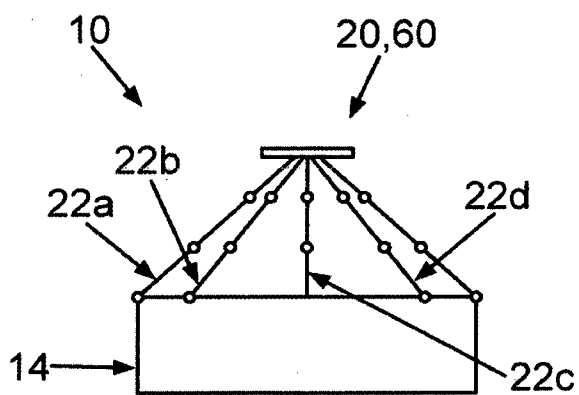


Fig. 6a

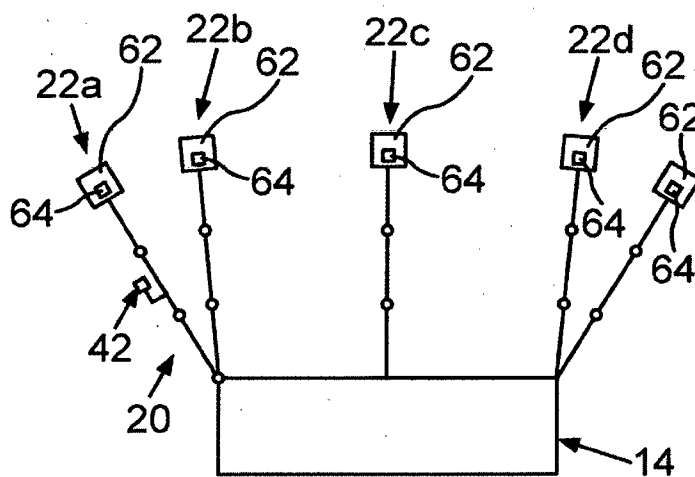


Fig. 6b

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/001034

A. CLASSIFICATION OF SUBJECT MATTER

INV. B60R9/042 B60R9/055 B60P1/54 B60P1/48
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 199 15 994 A1 (ARNDT HERBERT [DE]) 12 October 2000 (2000-10-12) column 3, lines 4-9 figures	1-9
A	----- US 6 099 227 A (SHELLHAMMER GARY L [US]) 8 August 2000 (2000-08-08) column 5, lines 11,12,20-25 column 6, lines 26-43 figures 2-7 -----	1-9



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See patent family annex.

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Date of the actual completion of the international search

7 September 2016

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Wisnicki, Michal

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19915994	A1	12-10-2000	NONE

US 6099227	A	08-08-2000	CA 2291924 A1 08-06-2000
		US 6099227 A	08-08-2000
