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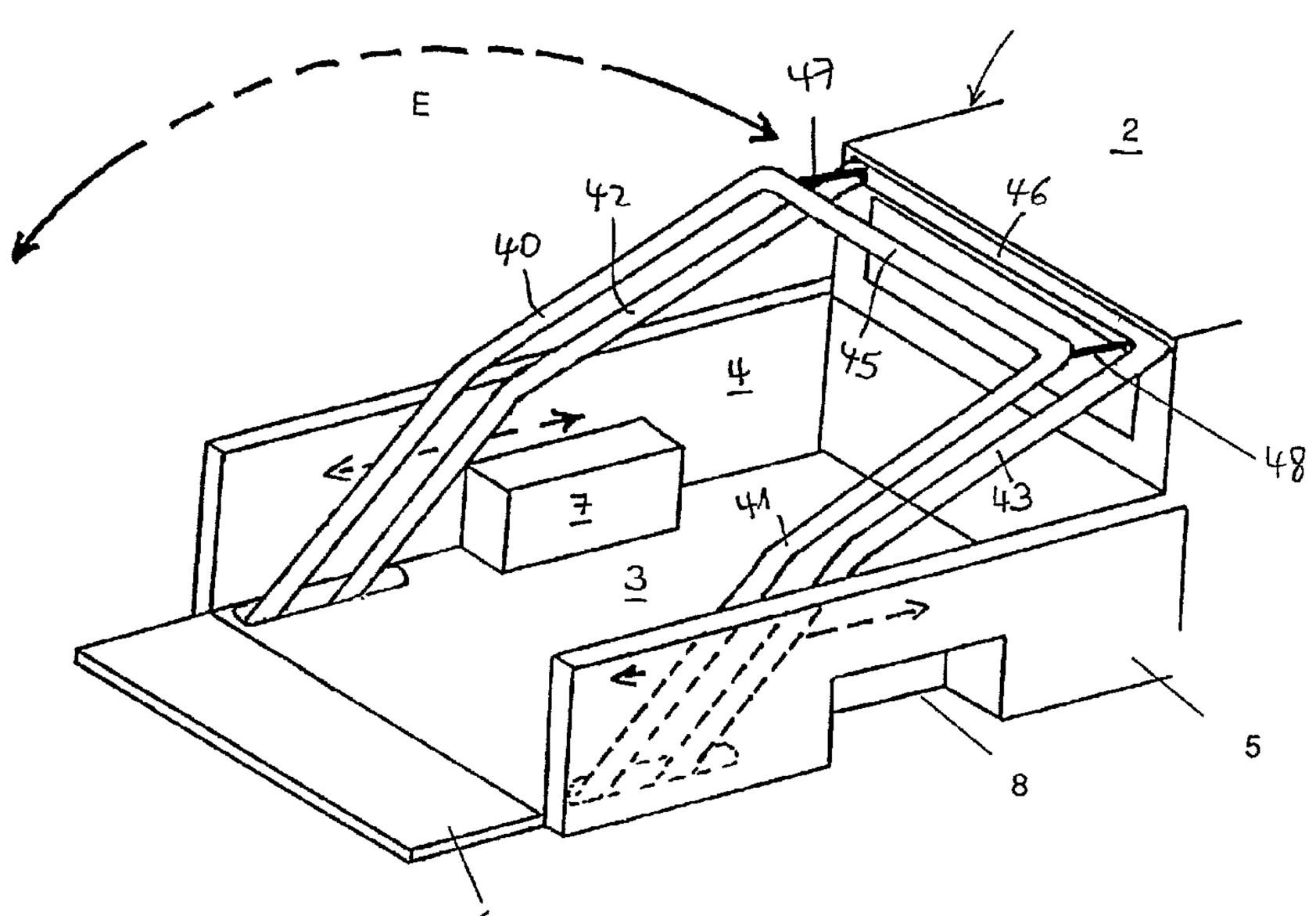
(54) Titre : VEHICULE DU TYPE PICK-UP POURVU D'UN DISPOSITIF OSCILLANT POUR SON CHARGEMENT ET SON DECHARGEMENT, ET DISPOSITIF OSCILLANT POUR UN VEHICULE DU TYPE PICK-UP

(54) Title: PICK-UP VEHICLE WITH A SWIVELING DEVICE FOR LOADING AND UNLOADING PURPOSES AND SWIVELLING DEVICE FOR A PICK-UP VEHICLE



(57) Abrégé/Abstract:
The invention relates to a pick-up vehicle (1) fitted with a swiveling device with swivelling arms (40-43). The swiveling arms have an angle or curvature and the swiveling device is located at the same height or is only slightly higher than the height of the vehicle when in a rest position. The pick-up vehicle can thus be loaded easily using said swiveling device. The inventive pick-up vehicle can also be used as a conventional road vehicle without any loss in performance capability.

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(54) Title: PICK–UP VEHICLE WITH A SWIVELING DEVICE FOR LOADING AND UNLOADING PURPOSES AND SWIVELLING DEVICE FOR A PICK–UP VEHICLE

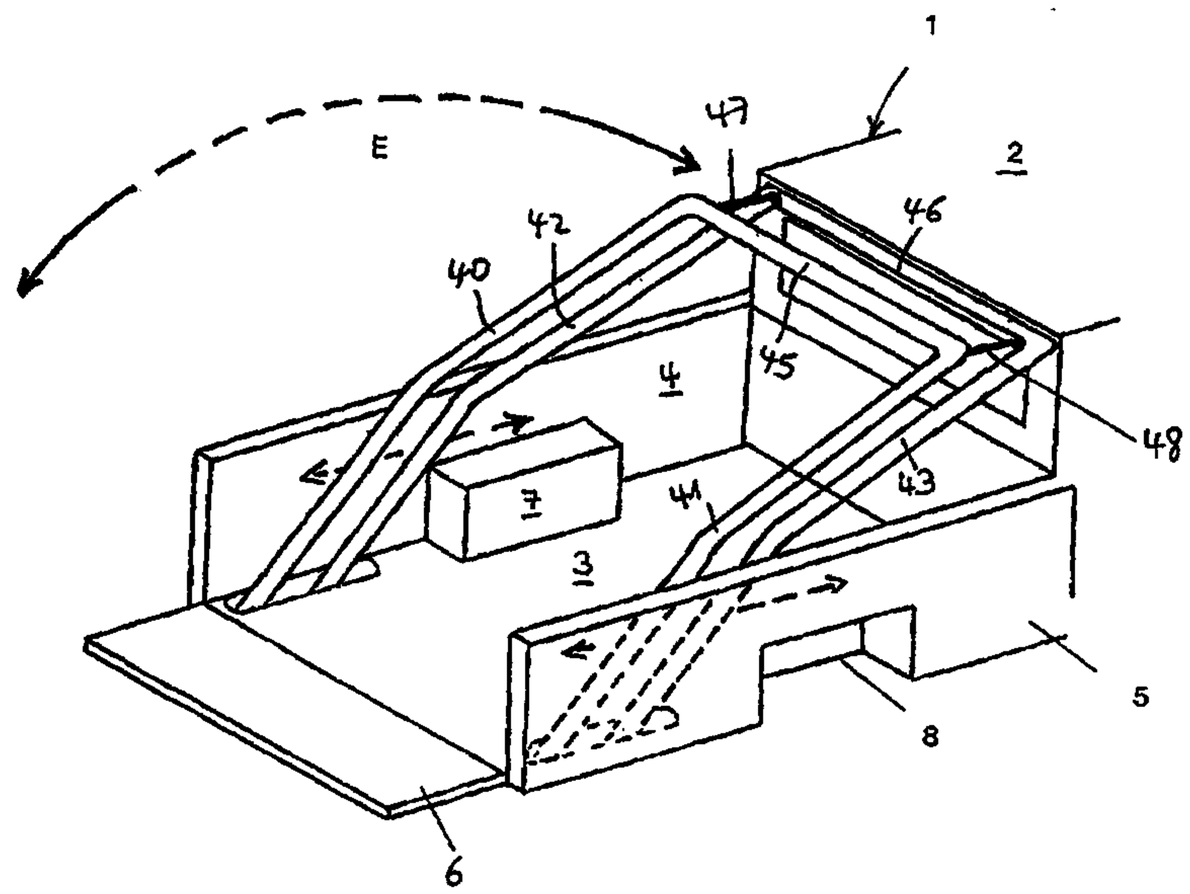
(54) Bezeichnung: PICK–UP–FAHRZEUG MIT EINER SCHWENKVORRICHTUNG ZU DESSEN BE– UND ENTLADUNG SOWIE SCHWENKVORRICHTUNG FÜR EIN PICK–UP–FAHRZEUG

(57) Abstract

The invention relates to a pick–up vehicle (1) fitted with a swiveling device with swivelling arms (40–43). The swiveling arms have an angle or curvature and the swiveling device is located at the same height or is only slightly higher than the height of the vehicle when in a rest position. The pick–up vehicle can thus be loaded easily using said swiveling device. The inventive pick–up vehicle can also be used as a conventional road vehicle without any loss in performance capability.

(57) Zusammenfassung

Bei einem Pick–up–Fahrzeug (1) wird eine Schwenkvorrichtung mit Schwenkarmen (40–43) vorgesehen, wobei die Schwenkarme eine Abwinkelung oder eine Krümmung aufweisen, so dass sich im Ruhezustand eine Höhe der Schwenkvorrichtung ergibt, welche diejenige des Fahrzeuges nicht oder nur wenig übersteigt. Auf diese Weise wird eine einfache Beladbarkeit des Pick–up's durch die Schwenkvorrichtung mit einer nicht herabgesetzten Gebrauchstauglichkeit des Pick–up's als normales Strassenfahrzeug kombiniert.



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PICK-UP VEHICLE WITH A SWIVELING DEVICE FOR LOADING AND UNLOADING PURPOSES AND SWIVELING DEVICE FOR A PICK-UP VEHICLE

Technical Field

The present invention relates to a pick-up vehicle and to a swivel device for loading and unloading the pick-up vehicle.

Background Art

The loading of pick-up vehicles e.g. road vehicles having a passenger cab connected to a cargo bed separated from the vehicle chassis, including side walls and a rear wall, can present problems with loads which cannot be lifted, either over the side walls or into the cargo bed through an opened rear wall, by hand. Since pick-up vehicles are being used more frequently as recreational vehicles, also called SUVs (sport utility vehicles), it would be beneficial to be able to load them with e.g. all-terrain motorcycles or small watercraft without problems. When loading motorcycles e.g. ramps can be used, however, this may require considerable dexterity and pose a certain safety hazard when the mo-

torcycle is driven onto the ramp. Of course, when loading watercraft, the ramp option is not available. Moreover, the loading of other loads by hand can also be problematic.

Swivel devices for unloading, offloading, and tilting of trough-shaped containers are known, e.g. for use with trucks and construction vehicles. For trucks, two lateral swivel arms are generally provided which are respectively swivelably linked with one end at the end of the truck chassis, and can have a holding device for a load-bearing device, e.g. chains or wire cable at their free end, which device can be attached to the hopper to be unloaded or offloaded. During unloading, the hopper is deposited or positioned on transverse or longitudinal supports of the truck chassis. The swivelling motion of the swivel arms is generally achieved by hydraulic activated piston/cylinder arrangements which are fastened to the chassis and to the respective swivel arm. CH-A-546 657 discloses a swivel device for a truck. EP-A-0 337 678 discloses a construction vehicle having a swivel device for hoppers, in which the hoppers are likewise laterally received on swivel arms. A bridge that connects the swivel arms to an additional holding element serves to hold the hopper in a fixed position, which is arranged on the swivel arms when this hopper is tilted.

With such known swivel/tilt devices, a large height in the rest state results which is not objectionable for trucks and speciality vehicles, i.e. construction vehicles, but which by contrast is unacceptable for road vehicles such as pick-up vehicles because these vehicles should also be able to negotiate residential and commercial garages as well as wash stations.

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Disclosure of invention

An object of the present invention is to provide a simple option for loading even bulky and/or heavy loads onto a pick-up vehicle without diminishing the vehicle's suitability as a normal road vehicle.

According to one aspect the invention provides pick-up vehicle having a swivel device for its loading and unloading, the vehicle being provided with an open cargo bed coupled to a passenger cab and being provided with wheel wells inside or outside of the cargo bed, wherein the swivel device is provided with swivel arms on both sides of the cargo bed, the swivel axes thereof being located between the end of the cargo bed and the wheel wells, wherein the swivel device is provided with two swivel axes being located one behind the other in longitudinal direction of the vehicle and each being provided with a swivel arm, which swivel arms are connected by at least one movable connecting piece to a parallelogram-like swivel arm structure so that the swivel arms are provided along their length with at least one curved or bent section, and wherein the swivel arms are connected by at least one connecting bridge to a swivel yoke, characterized in that at least one load uptaking means is provided which is fixed to the connecting piece by a rigid suspension which is rigidly connected to the connection piece.

According to another aspect the invention provides swivel device for loading and unloading of a pick-up vehicle, which vehicle is provided with an open cargo bed coupled to a passenger cab and with wheel wells inside or outside of the cargo bed, the swivel device being provided on both sides of the cargo bed with swivel arms on both

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sides of the cargo bed, the swivel axes of the swivel arms being provided for an arrangement between the end of the cargo bed and the wheel wells, wherein the swivel device is provided with two swivel axes located one behind the other in longitudinal direction of the vehicle, each swivel axis being provided with a swivel arm, which swivel arms are connected by at least one connecting piece movably connecting the swivel arms together to form a parallelogram-like swivel arm structure, so that the swivel arms are provided along their length with at least one curved or bent section, and wherein the swivel arms are connected by at least one connecting bridge to a swivel yoke, characterized in that at least one load uptaking means is provided which is fixed to the connecting piece by at least one rigid suspension which is rigidly fixed to the connection piece of the swivel arm structure.

Having the swivel device of the instant invention for loading and unloading a pick-up vehicle allows for effortless loading and unloading by depositing a load on the ground behind the vehicle or on the cargo bed, and for a reduction in the height at the rest position through the curvature of or bend in the swivel arms, which renders the pick-up vehicle still roadworthy.

A further object of the present invention is to provide a swivel device for the pick-up vehicle which ensures good loadability of the vehicle without impairing the use of the vehicle as a road vehicle.

The bowed or bent swivel arms of the swivel device enables the swivel device to be arranged on a pick-up vehicle without significantly increasing height of such a vehicle; the swivel device allows for simple loading and unloading of the pick-up vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

Special embodiments of the invention are explained with reference to the drawings, wherein

Figure 1 illustrates a schematic, diagrammatic view of a first embodiment of a swivel device coupled to a pick-up vehicle shown only partially;

Figure 2 illustrates a schematic side view of the pick-up vehicle depicted in Figure 1, wherein one half of the bed is not shown;

Figure 3 illustrates a schematic, diagrammatic view of another embodiment of the swivel device coupled to a partially depicted pick-up vehicle;

Figure 4 illustrates a schematic side view of the embodiment depicted in Figure 3, wherein one half of the bed is not shown;

Figures 5a-5e illustrate schematic side views of swivel arms;

Figure 6 illustrates a schematic, diagrammatic view of another embodiment in which the swivel arms are connected to two parallelograms; and

Figure 7 illustrates a schematic side view of a pick-up vehicle wherein one half of the bed is not shown.

Modes for Carrying Out the Invention

Figure 1 illustrates a schematic partial view of a pick-up vehicle 1 in which a passenger cab 2 is only partially depicted and the pick-up vehicle 1 also includes a cargo bed 3 that includes side walls 4 and 5 and rear wall 6. Rear wall 6 is depicted in an opened position, and can be swung upwardly so to close the cargo bed. Rear wall 6 can also be totally downwardly foldable. In the exemplary embodi-

ment, wheel wells 7 and 8 project into bed 3 of pick-up vehicle 1. However, wheel wells 7 and 8 can also be arranged as fenders outside the actual cargo bed, e.g. if the bed is correspondingly narrower, or the wheels are arranged with corresponding fenders outside of vehicle 1. In Figure 1, a swivel device having two swivel arms 10 and 11 is schematically depicted in a rest position. In the exemplary embodiment, a bridge 12, which extends cross-wise to the a vehicle longitudinal axis, is utilized to connect ends of swivel arms 10 and 11 to each other to form a U-shaped swivel yoke. In the depicted embodiment, the ends of swivel arms 10 and 11 are coupled to axial elements 20 and 21 which form together a rotational axis for the swivel yoke. Axial elements 20 and 21 can hereby be respectively accepted in a support bracket, of which only support bracket 23 is depicted in Figure 1 in dashed lines. The construction of the swivel support is known to those ordinarily skilled in the art, and, therefore, need not be discussed further here. Support bracket 23 can be fixed on an upper side of the cargo bed or on a lower side of the cargo bed, and if necessary, the cargo bed can be reinforced at these locations with plates or braces. Arrow E shows the swivelling motion between the rest position, in which bridge 12 of the support yoke lies near or adjacent cab 2, and a load uptake position, in which the support yoke is swung away from cab 2 into a ready position to accept a load.

Figure 2 illustrates a sectional side view of pick-up vehicle 1 in which side wall 5 and swivel arm 11 nearer to the viewer are not depicted, so as to more clearly depict side wall 4 and swivel arm 10 and its swivel axis 20. Same reference characters are used identifying identical parts from Figure 1. The swivel arm 10 is depicted in Figure 2 once in the rest position as swivel arm 10 and in the load position swivelled rearwards as swivel arm 10'.

A loading platform 25 can be preferably fastened to load contact points 13 of swivel arms 10 and 11 via chains or wire cables 28 and 29. In the exemplary embodiment, load contact points can be formed by bridge 12, which connects the ends of swivel arms 10 and 11. However, if the bridge is not provided, which results in the swivel arms not being connected to one another, the load can be accepted at the free ends of swivel arms 10 and 11. Platform 25 facilitates simple loading of the cargo bed with e.g. a motorcycle, which can be driven onto the platform when the platform is placed on the ground behind pick-up vehicle 1, as schematically illustrated in Figure 2. After the load is arranged on the platform, it can be loaded by swivelling the swivel device forward to the cab 2 into the bed 3 of the pick-up vehicle. For unloading, the process is performed by a swivel motion to the rear. Of course, instead of platform 25 another element can be provided which can accept a load, or the load can be attached directly to the swivel arms or the bridge, i.e. without a platform or auxiliary element, with e.g. ropes or chains, and can be loaded into bed 3 by swivelling the swivel device.

Driving of the swivel device for loading or unloading swivelling movements can be effected in basically known manner, e.g. with a hydraulic piston/cylinder arrangement coupled between bed 3 or the vehicle chassis, respectively, and the respective swivel arm. Such an arrangement is roughly schematically indicated by arrow B in Figure 1. The arrangement of such a drive is known to those ordinarily skilled in the art, and, therefore, need not be shown further here. Further, instead of such the known hydraulic piston/cylinder arrangement drive, a pneumatically driven piston/cylinder arrangement could also be provided. In both cases, the hydraulic or pneumatic pressure can be created by a pump which is either connected to a motor drive of the ve-

hicle or to its own motor, e.g. an electric motor coupled to the vehicle battery. Moreover, instead of a piston/cylinder arrangement drive, an electric motor drive could be provided which, e.g. via a toothed gear, drives swivel arms 10 and 11 directly from the region of the swivel axis. Control and operation of the swivel motion or of the corresponding drive can be performed by a control and operation unit which can be arranged, e.g. in the passenger cab or in the bed of the vehicle. Such a control and operation unit can have e.g. an infrared or radio control so that the swivel device can be operated at some distance from the vehicle.

In the example shown, swivel arms 10 and 11 are bent, with a first section 14 or 16 of respective swivel arm 10 or 11 extending from rotational axis 20 or 21. However, after first section 14 or 16, swivel arms 10 and 11 are bent to form respective bent sections 15 or 17, thus decreasing the height of swivel arms 10 and 11, when they are arranged in the rest position. The elevation of the end of swivel arms 10 and 11, or bridge 12, if provided, can be varied by the location of the bend and by the choice of angle α. It is preferable for the elevation of the swivel arm ends, or the swivel yoke to lie approximately at the height of the upper edge of the passenger cab. Of course, a slightly higher rest position or a lower rest position can also be chosen. In the exemplary embodiment, swivel arms 10 and 11 can be connected in their rest position to a swivel yoke that projects over the cab roof, so that the swivel device forms a roll bar for the passenger cab. In this manner, a support 40 may be preferably provided which is coupled, e.g. to the vehicle chassis to provide a fixed support for the swivel yoke in the rest position.

It is also contemplated that the swivel yoke or swivel arms 10 and 11 can also be longitudinally adjustable

to provide at least a partial telescopic motion of the swivel arm bent sections 15 and 17. Such an arrangement may be especially practical when the swivel device is provided as a retrofit element for an existing pick-up vehicle and, through this adjustability of the swivel arm length, the swivel device can be adaptable to a variety of vehicle types or lengths of cargo beds. Furthermore, an activation mechanism can be provided for rear wall 6 so that rear wall 6 can automatically open when the swivel device is swung out, or so that the rear wall closes when this swivel device is swung in.

Figures 3 and 4 illustrate another embodiment in which identical parts are identified with the same reference numerals. The swivel device depicted in Figures 3 and 4 is basically similar to that depicted in Figures 1 and 2, except that, where Figure 1 illustrates an embodiment that is well suited for retrofitting a pick-up vehicle not equipped with a swivel device at the factory, Figures 3 and 4 illustrate an embodiment which could be preferably used for fitting a pick-up vehicle with a swivel device at the factory. In this embodiment, the swivel axis for the swivel arms or for the swivel yoke can be arranged beneath a surface of cargo bed 3, so that cargo bed 3 can include recesses through which the swivel arms of the swivel yoke can project. In this case, the rotational axis or axial elements 30 and 31, or possibly a continuous axis or shaft, can be arranged on the chassis of vehicle 1 represented only by the support thereof. Since pick-up vehicles are generally equipped with a separate chassis, e.g. a ladder frame chassis and not with a self-supporting body, the chassis can provide a stable linkage point for the swivel device, and which, as a rule, can allow loads heavier than those utilized with the swivel device arrangement on bed 3, as shown in Fig. 1. In this embodiment,

the drive for the swivel arms preferably lies beneath the cargo bed and, e.g. can contact downward extension of the swivel arms, beneath the rotational axis. Such an arrangement is schematically depicted in Figure 2 with arrows B. Other aspects discussed above with regard to Figures 1 and 2 apply to the alternative exemplary embodiment of Figures 3 and 4.

Moreover, Figure 4 illustrates a side view of pick-up vehicle 1 without side wall 5 and swivel arm 11, i.e. which depicts directly side wall 4 and swivel arm 10. Swivel arm 10 and 10' are depicted in this figure, such that swivel arm 10 is depicted the rest position, and swivel arm 10' in depicted in the swung-out position.

Figures 5a-5e, which illustrate alternative exemplary embodiments of swivel arms 10 from a side view, utilize same reference numerals to identify identical elements from the previous Figures. 5a illustrates a swivel arm 10 where first a section 34 extends essentially vertically upwardly from swivel axis 20, and a contrastingly bent swivel arm portion 35 is arranged to extend to load uptake point 13. Sections 36 and 37 are arranged to form braces, i.e. in the shape of a triangle for the upper part of the swivel arm. In a rough schematic depiction, three piston/cylinder arrangements are shown, e.g. to indicate where generally known drives could be positioned for coupling to the swivel arms. Both of the uppermost depicted drive arrangements can effect a backward swivelling by pushing the swivel arm, and the bottom most depicted drive arrangement, which lies below the rotational axis, effects an outward swivel by pulling downwardly on the extension of section 34, which is cut off in the illustration.

Figure 5b illustrates another embodiment in which sections 36 and 37 of the swivel arm are coupled to upwardly leading section 34. Figure 5c, in contrast illustrates an em-

bodiment in which section 35 is coupled to section 34. Figure 5d illustrates an embodiment of swivel arm 10 having sections 34 and 36. Figure 5e illustrates an embodiment in which swivel arm 10 which, instead of being a bent swivel arm, is formed as a curved swivel arm. In this embodiment as well, the height of swivel arm 10, in contrast to prior art swivel arm arrangements, can be decreased so that an overall lower height is obtained when used with a pick-up vehicle. Three swivel arm sections 37, 38 and 39 are depicted in the exemplary illustration. In a manner analogous to the other examples 5a-5d, it is possible e.g. to only provide swivel arm section 37 or, in another embodiment, to only provide swivel arm sections 38 and 39.

Figure 6 illustrates another embodiment of the present invention (which is similar to the embodiment depicted in Figure 3, in which the swivel axis is located beneath cargo bed 3) however, in this alternative embodiment, two bent swivel arms are provided on each side of cargo bed 3, and the same reference numerals are used to identify identical elements. In Figure 6, bed 3 is provided with swivel arms 40 and 42 on one side, and swivel arms 41 and 43 on the other side. In this embodiment, the swivel arms are preferably coupled to one another via a bridge 45 and via a bridge 46, respectively. Moreover, additional connections can be provided between bridges or arms 45 and 46, respectively, to form a parallelogram-like structure on each side of the bed 3. The connections are depicted in Figure 4 by lines 47 and 48 and are of course rotatably coupled to the arms to enable swivelling motion of swivel arms thus connected. The configuration of rotatable couplings for connections 47 and 48 to the bridges or arms can be made in quite different manners which are evident to those ordinarily skilled in the art, and, therefore, will not be discussed further here. The first

and second swivel yokes, which are thus formed from connecting swivel arms 40 and 41 through bridge 45, and from connecting swivelling arms 42 and 43 through bridge 46, are each swivelably arranged about individual axes for which all embodiments mentioned before located above or below the plane of cargo bed 3 are possible. A swivel drive can also be provided as already explained and thus for only one swivel arm on each side, or for each swivel arm on each side. The load not shown in Figure 6, e.g. platform 25 depicted in Figure 1, can be attached to the double yoke structure with e.g. two, four, or even more rigid suspensions (such as rigids rods coupled to the connections and the load), or movable suspensions (such as chains fastened to connections and the load). The attachment locations of these suspensions to the swivel yokes can be positionally fixed or positionally adjustable at the yoke. Through the provision of a plurality of suspensions, a stable attachment of the load is achieved, which to a large extent prevents swinging of the load.

Figure 7 illustrates again a side view of a pick-up vehicle that depicts directly side wall 4 and swivel arms 40 and 42 without showing side wall 5 or swivel arms 41 and 43. As shown the swivel arms 40 and 41 form a parallelogram-like structure with connection 47 movably connected at points 50 and 51 with the remainder of each arm, as discussed above with regard to Figure 6. As with the other parts of swivel arms, connection 47 can be formed of e.g. steel pipe having a circular, rectangular or square cross section. In the embodiment depicted in Figure 7, swivel axes 52 and 53 can be located above cargo bed 3 at various heights, as indicated by dashed line 54. However, the swivel axes could also lie at the same height above or below cargo bed 3. In the instant embodiment, the bending of the swivel arms is created only by the connection being bent in relation to the remainder of the

swivel arms and Figure 7 shows only connection 47. Figure 7 shows the swivel arm arrangement in a rest position as swivel arms 40, 42, 47 and two different extended positions with broken lines as swivel arms 40', 42', 47' and swivel arms 40", 42", 47". Because of the parallelogram-like structure, connection 47, 47' and 47" always remains in the same position with respect to a horizontal line as line 54 that extends through axes 52 and 53, thereby creating a bending of the swivel arms with a changing angle α. A loading platform 25 can be rigidly coupled via a rigid rod 59 to a location 58 on connection 47 of the swivel arm, so that loading platform 25 maintains its horizontal position during swinging and, on account of its rigid connection, cannot proceed to swing. This arrangement is advantageous as compared to the embodiment depicted in Figure 2 in which platform was suspended because a non-swinging load is easier to handle and poses less of an accident hazard. Thus, the parallelogram-like solution illustrated in Figures 6 and 7 represents the preferable arrangement.

The depicted swivel arms with their bending or curvature generally allow for swivel arrangements to be coupled to pick-up vehicles without impairing the road worthiness of the vehicles, since the height of the swivel arms essentially corresponds to the height of the pick-up vehicle. Moreover, additional devices for loading such as a cable winch are not necessary. A maximum height in the rest state can thus be defined by the bending or curvature of the swivel arms. The swivel device, which can be provided at the factory as original equipment for a pick-up vehicle or as a retrofit solution with a swivel device being retrofitted onto an existing pick-up vehicle, enables in both cases a simple loading of the cargo bed of the pick-up vehicle. Thus, loading with recreational vehicles can be made particularly easier

when the swivel device additionally includes a loading platform which can be driven onto in its loading position, especially when the platform is attached to a parallelogram-like structure that maintains the horizontal position of the platform during swivelling. Of course, instead of such a platform, any loads can be provided, such as large vessels or containers which can be loaded or which can contain a device.

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CLAIMS:

1. Pick-up vehicle having a swivel device for its loading and unloading, the vehicle (1) being provided with an open cargo bed (3) coupled to a passenger cab (2) and being provided with wheel wells (7, 8) inside or outside of the cargo bed, wherein the swivel device is provided with swivel arms (40, 41, 42, 43, 47, 48) on both sides of the cargo bed, the swivel axes thereof being located between the end of the cargo bed and the wheel wells, wherein the swivel device is provided with two swivel axes (52, 53) being located one behind the other in longitudinal direction of the vehicle and each being provided with a swivel arm (40, 42; 41, 43), which swivel arms are connected by at least one movable connecting piece (47, 48) to a parallelogram-like swivel arm structure so that the swivel arms are provided along their length with at least one curved or bent section, and wherein the swivel arms are connected by at least one connecting bridge (45, 46) to a swivel yoke, characterized in that at least one load uptaking means is provided which is fixed to the connecting piece by a rigid suspension (59) which is rigidly connected to the connection piece (47, 48).

2. Pick-up vehicle according to claim 1, characterized in that the swivel axes are positioned essentially on the load bed plane.

3. Pick-up vehicle according to claim 1, characterized in that the swivel axes are positioned below the cargo bed plane.

4. Pick-up vehicle according to claim 1, characterized in that at least one of the swivel axes is raised against the cargo bed plane.

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5. Pick-up vehicle according to claim 1, characterized in that the swivel yoke forms in its rest position a roll bar for the passenger cab.

6. Pick-up vehicle according to any one of claims 1 to 5, wherein the load uptaking means is a platform.

7. Swivel device for loading and unloading of a pick-up vehicle, which vehicle (1) is provided with an open cargo bed coupled to a passenger cab (2) and with wheel wells (7, 8) inside or outside of the cargo bed, the swivel device being provided on both sides of the cargo bed with swivel arms on both sides of the cargo bed, the swivel axes of the swivel arms being provided for an arrangement between the end of the cargo bed and the wheel wells, wherein the swivel device is provided with two swivel axes (52, 53) located one behind the other in longitudinal direction of the vehicle, each swivel axis being provided with a swivel arm (40, 42; 41, 43), which swivel arms are connected by at least one connecting piece (47, 48) movably connecting the swivel arms together to form a parallelogram-like swivel arm structure, so that the swivel arms are provided along their length with at least one curved or bent section, and wherein the swivel arms are connected by at least one connecting bridge (45, 46) to a swivel yoke, characterized in that at least one load uptaking means is provided which is fixed to the connecting piece (47) by at least one rigid suspension (58, 59) which is rigidly fixed to the connection piece of the swivel arm structure.

8. Swivel device according to claim 7, characterized in that the swivel axis is adapted to be supported on the cargo bed (3) by means of a support bracket (23).

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9. Swivel device according to claim 7, characterized in that the swivel axis (30, 31) is provided to be arranged on the chassis of the pick-up vehicle (1).

10. Swivel device according to any one of claims 7 to 9, characterized in that it is provided with longitudinally adjustable lifting arms.

11. Swivel device according to any one of claims 7 to 10, characterized in that it comprises a hydraulic, electric, pneumatic or muscle-activated drive for swivelling of the swivel yoke.

12. Swivel device according to any one of claims 7 to 11, wherein the load uptaking means is a platform.

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PATENT AGENTS

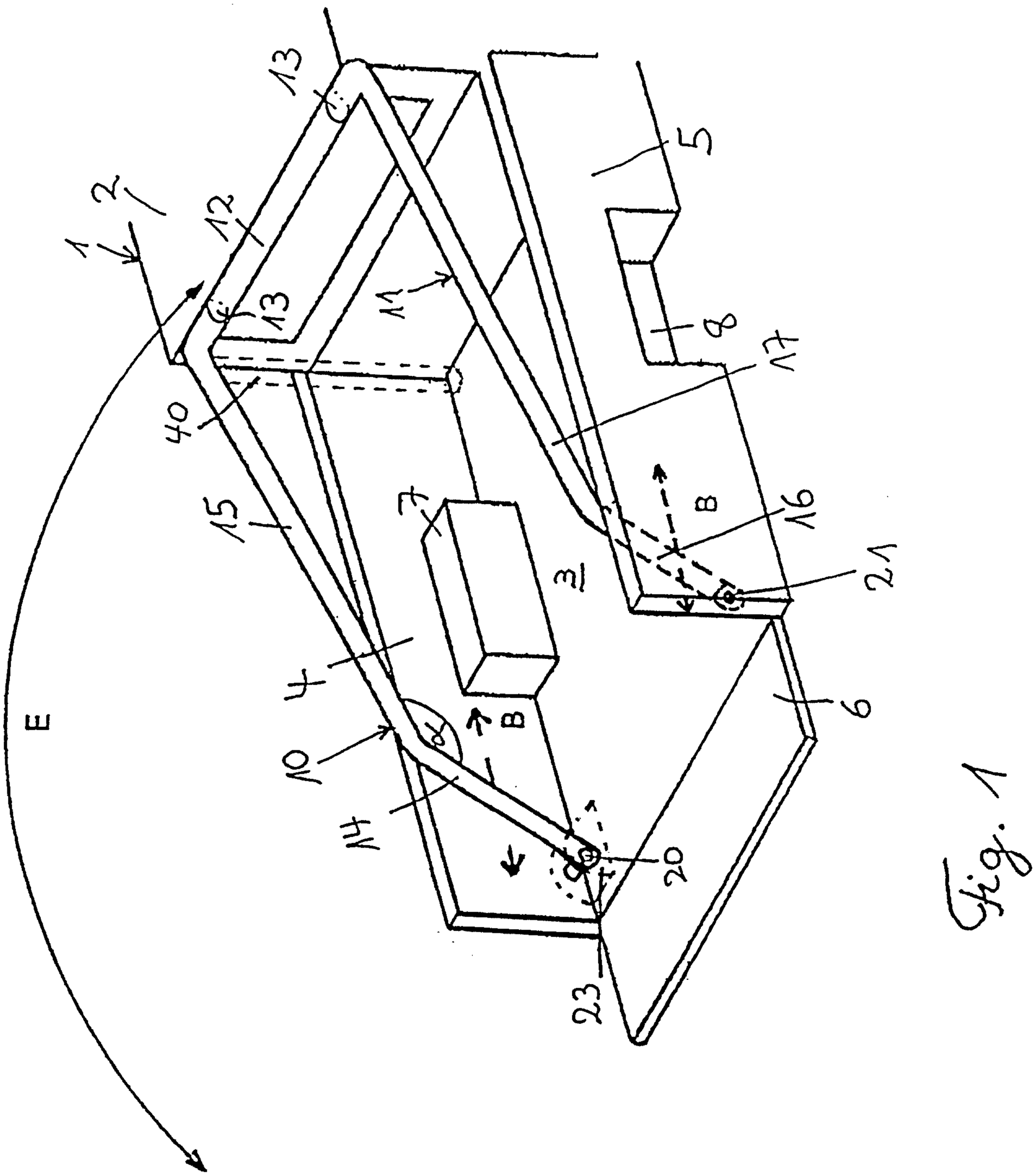


Fig. 1

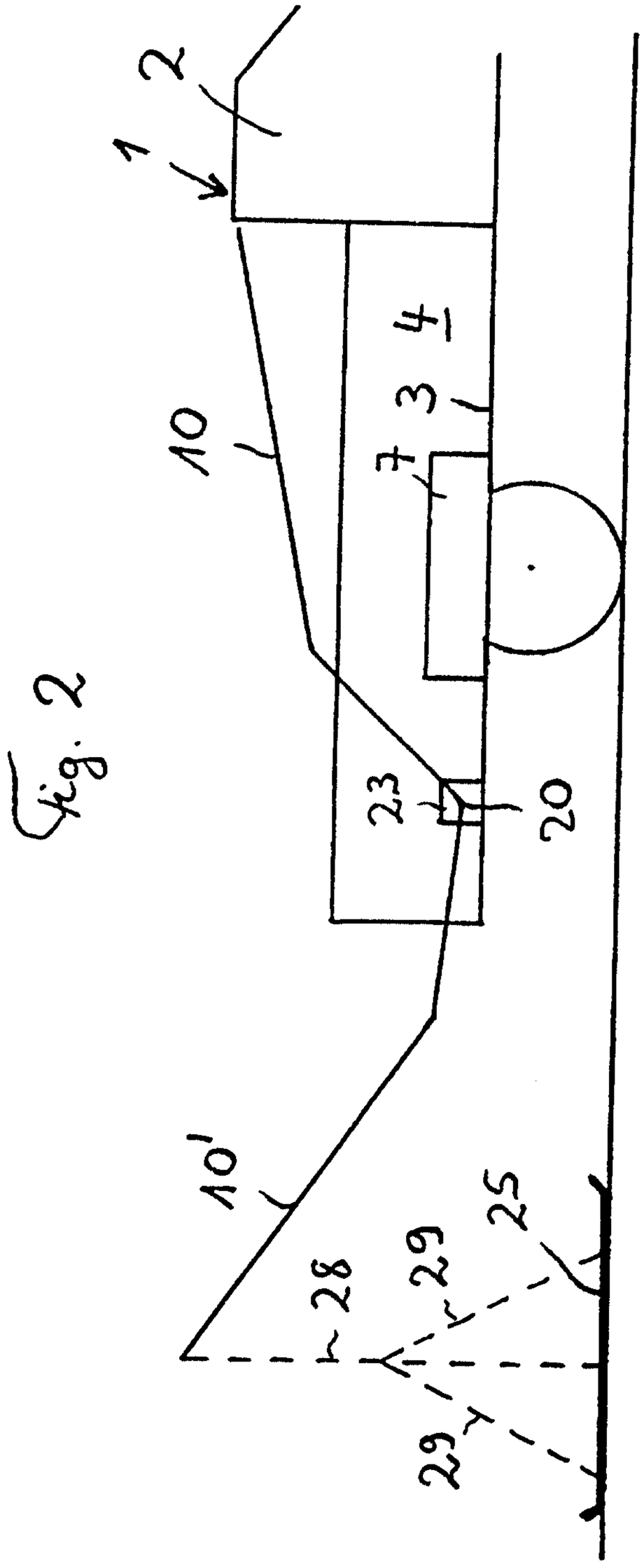


Fig. 2

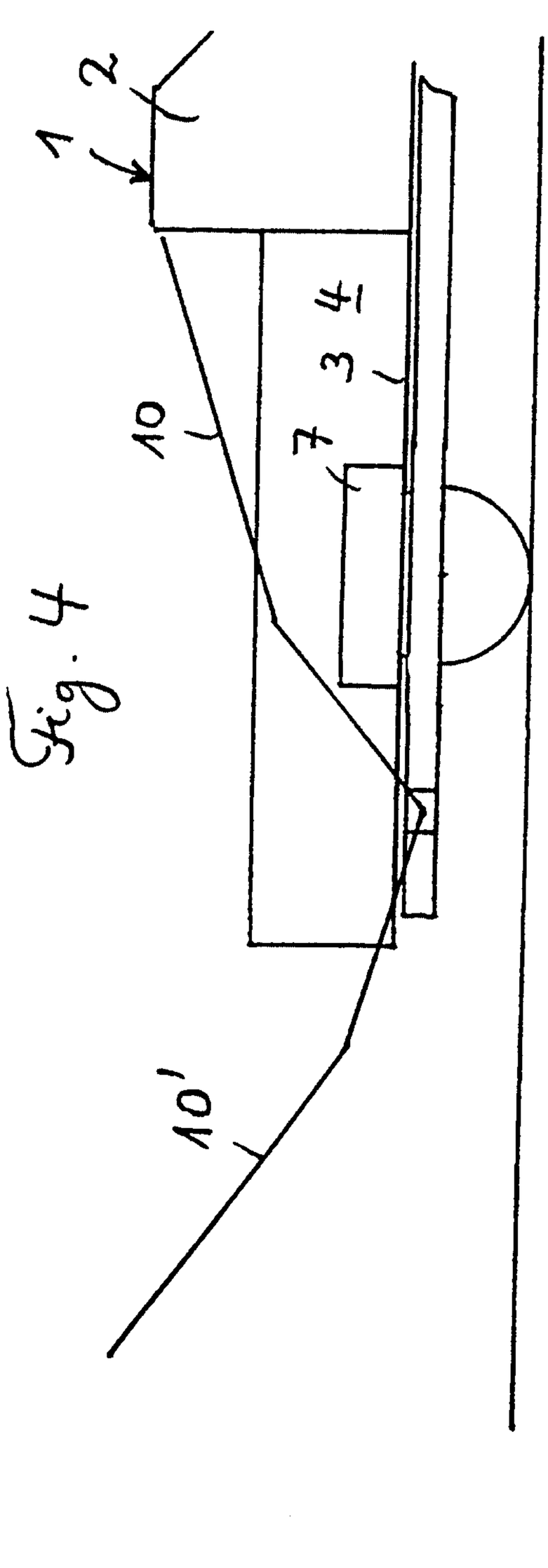


Fig. 4

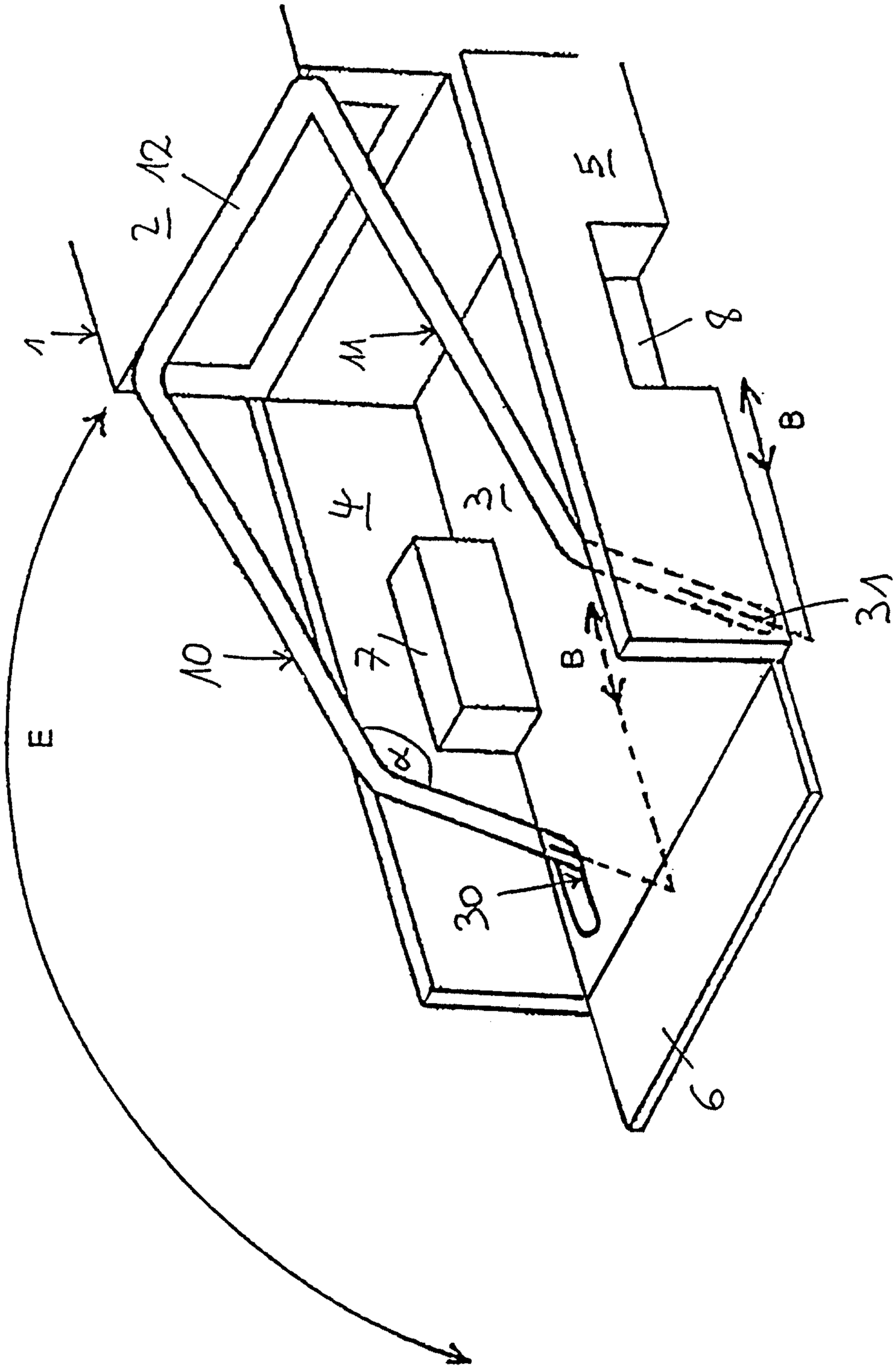


Fig. 3

Fig. 5a

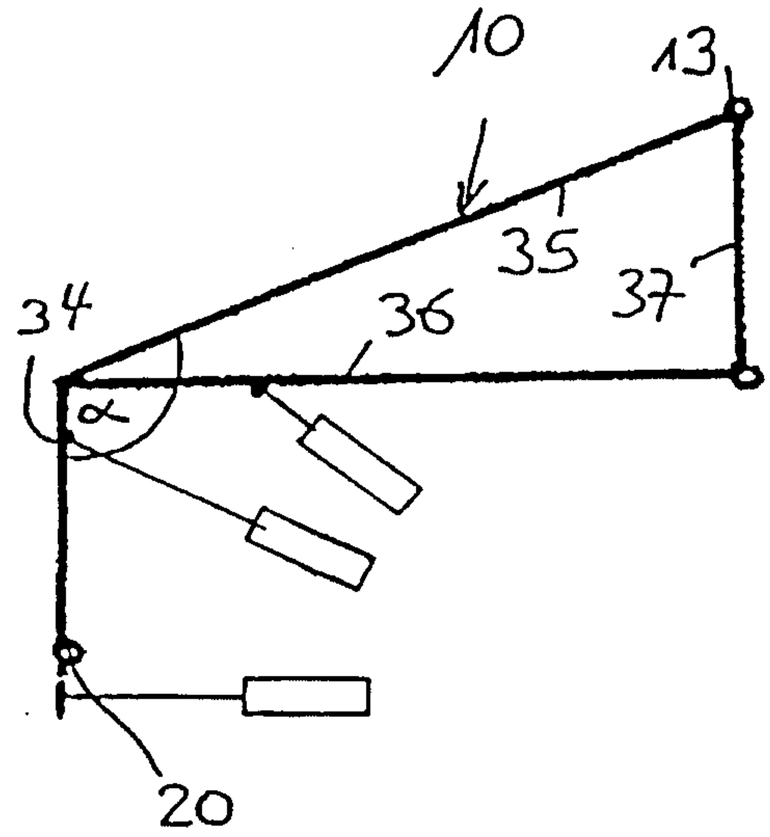


Fig. 5c

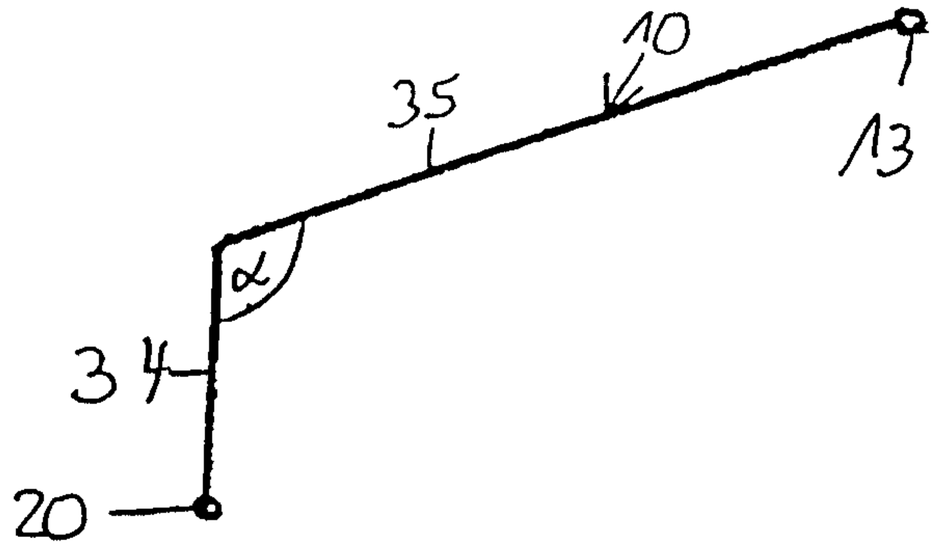


Fig. 5b

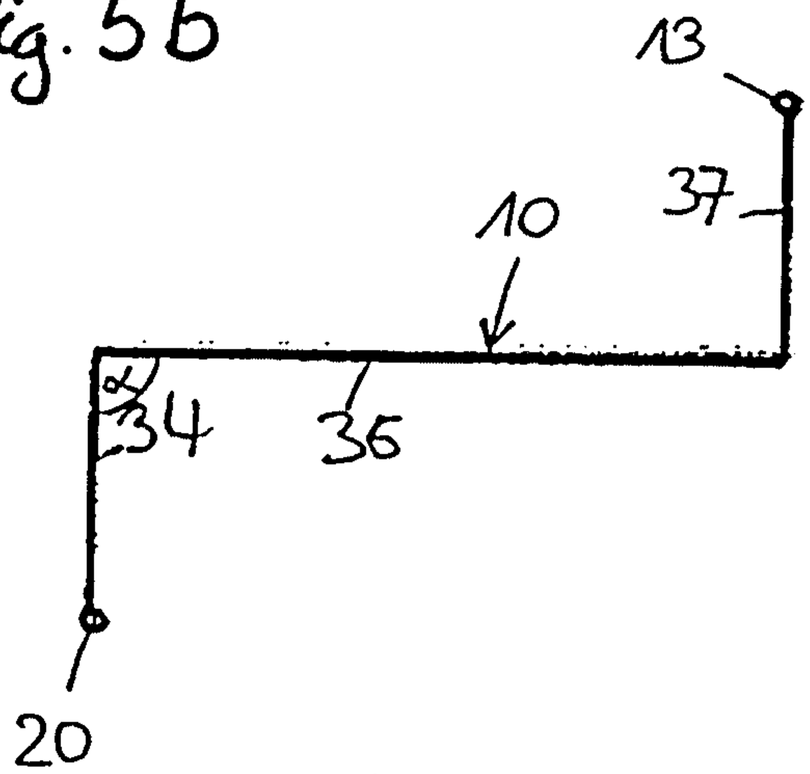


Fig. 5d

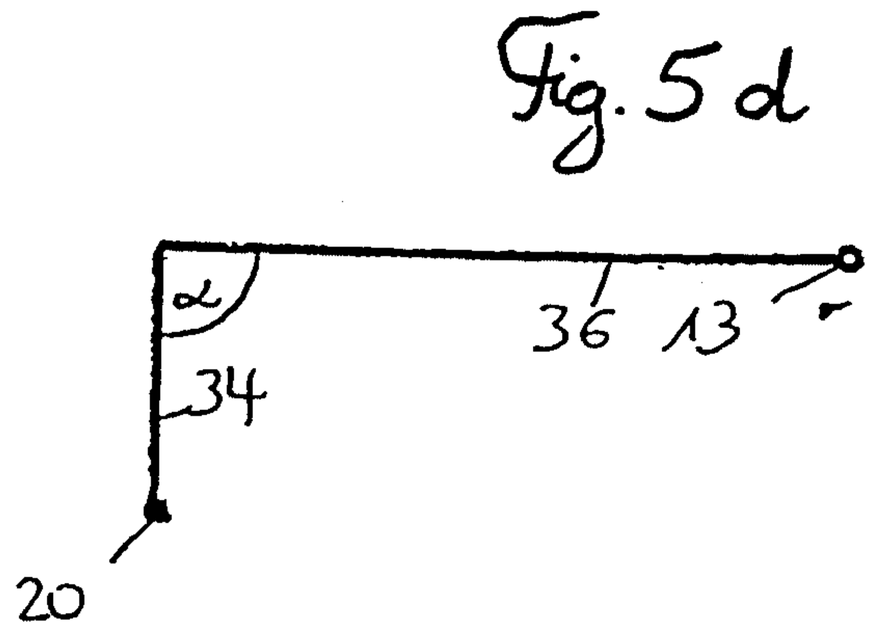
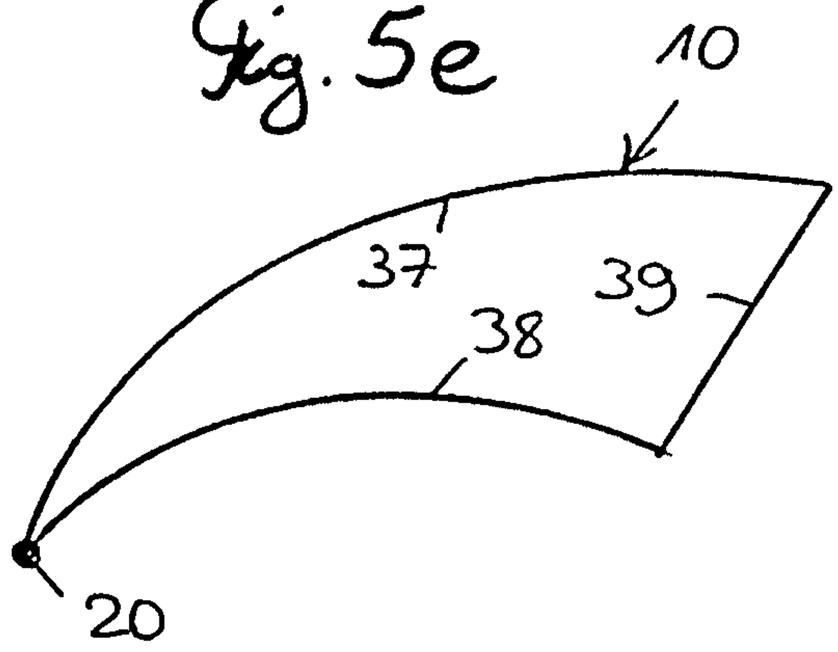


Fig. 5e



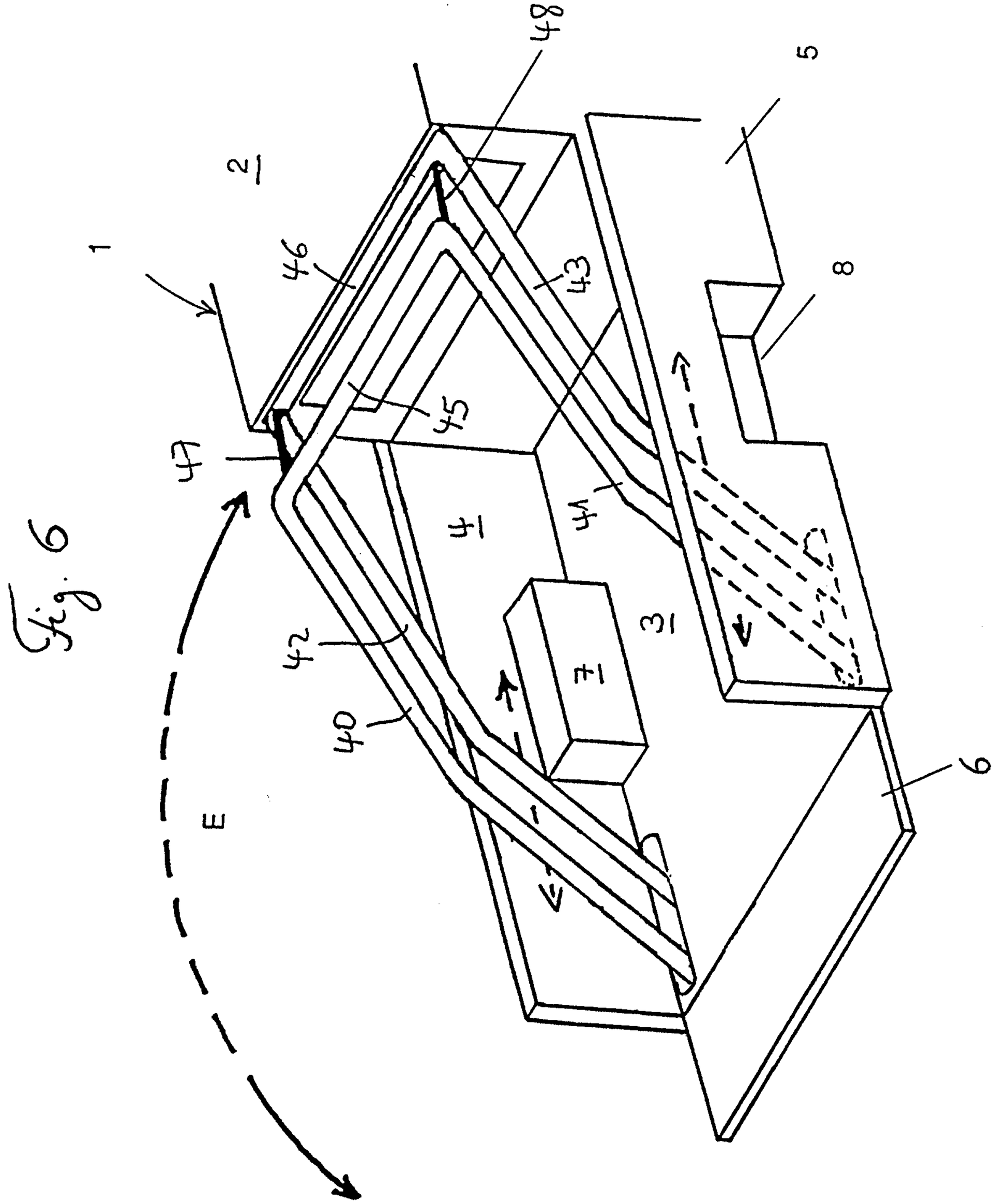


Fig. 6

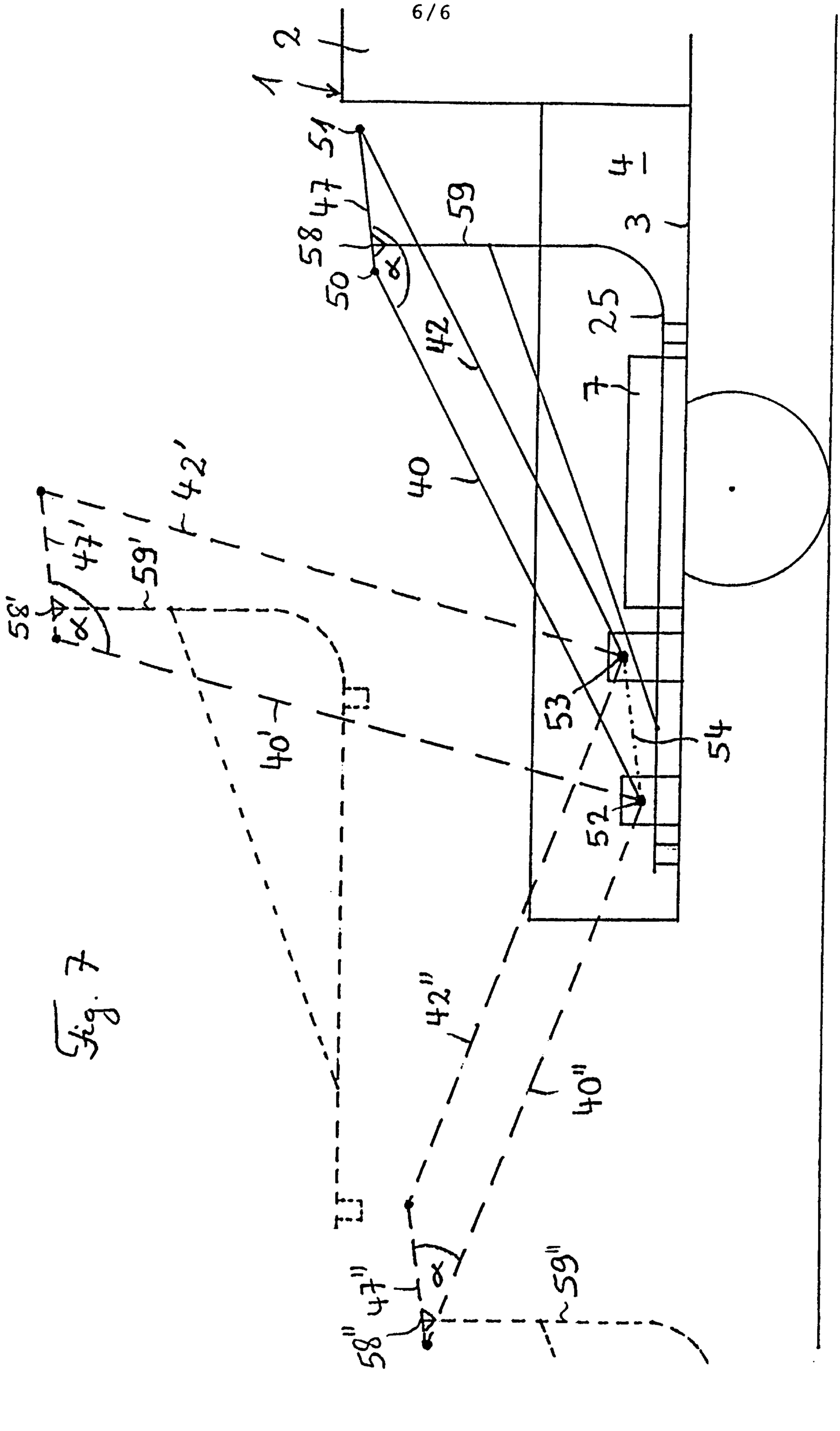

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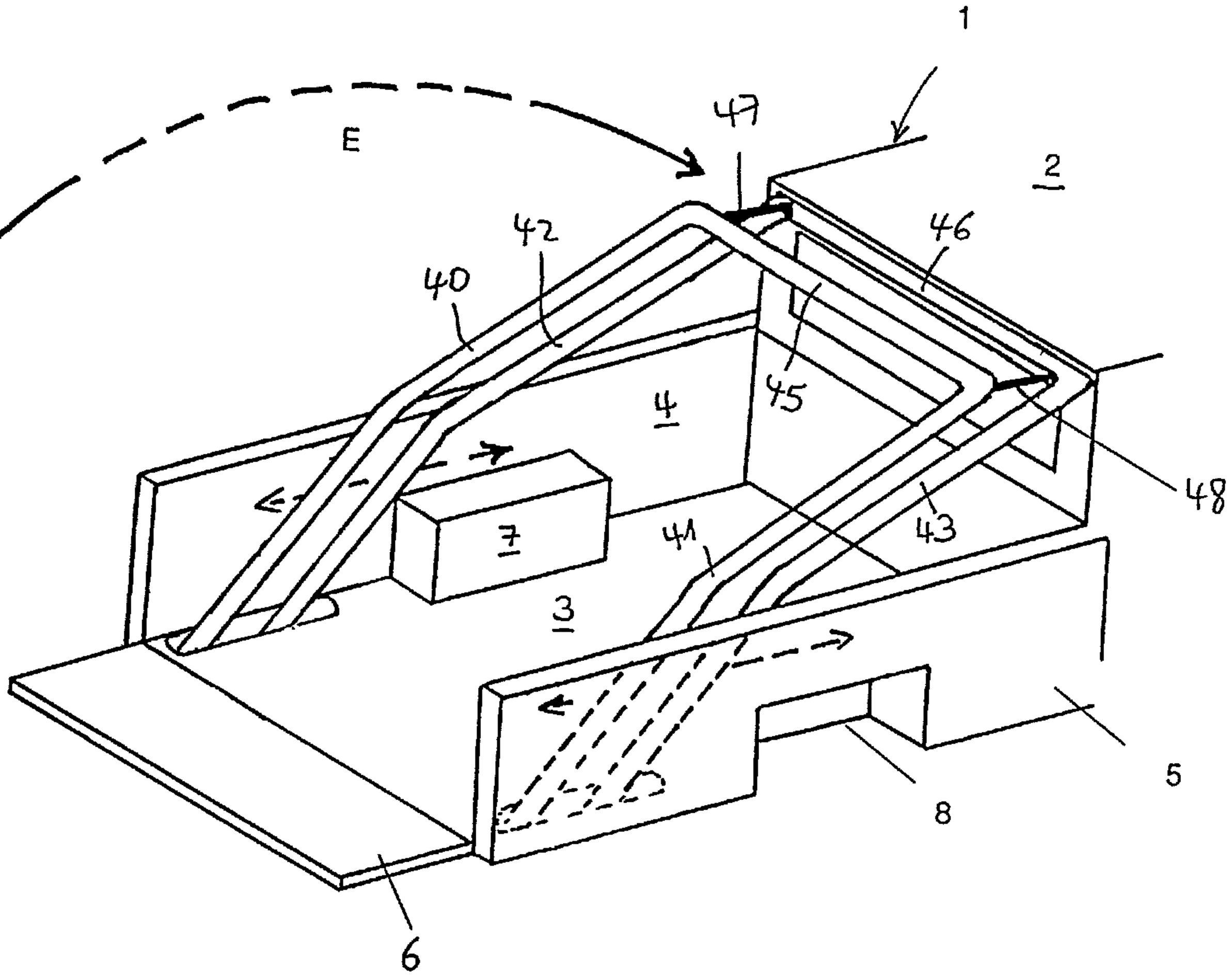
Fig. 7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