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(54) Collapsible trampoline

(57) A trampoline (2) with a trampoline mat (44) fastened to a surrounding frame for suspending the trampoline mat (44), and including a support for the frame, where the frame is foldable and has at least two frame sections (4, 6) with a first, collapsed position for storing

and moving the trampoline (2), and a second, unfolded position where the frame sections (4, 6) in the unfolded position are horizontal, and the trampoline mat (44) is suspended, where the trampoline (2) includes electrically, hydraulically or pneumatically automatised means for unfolding and collapsing, respectively, the frame.

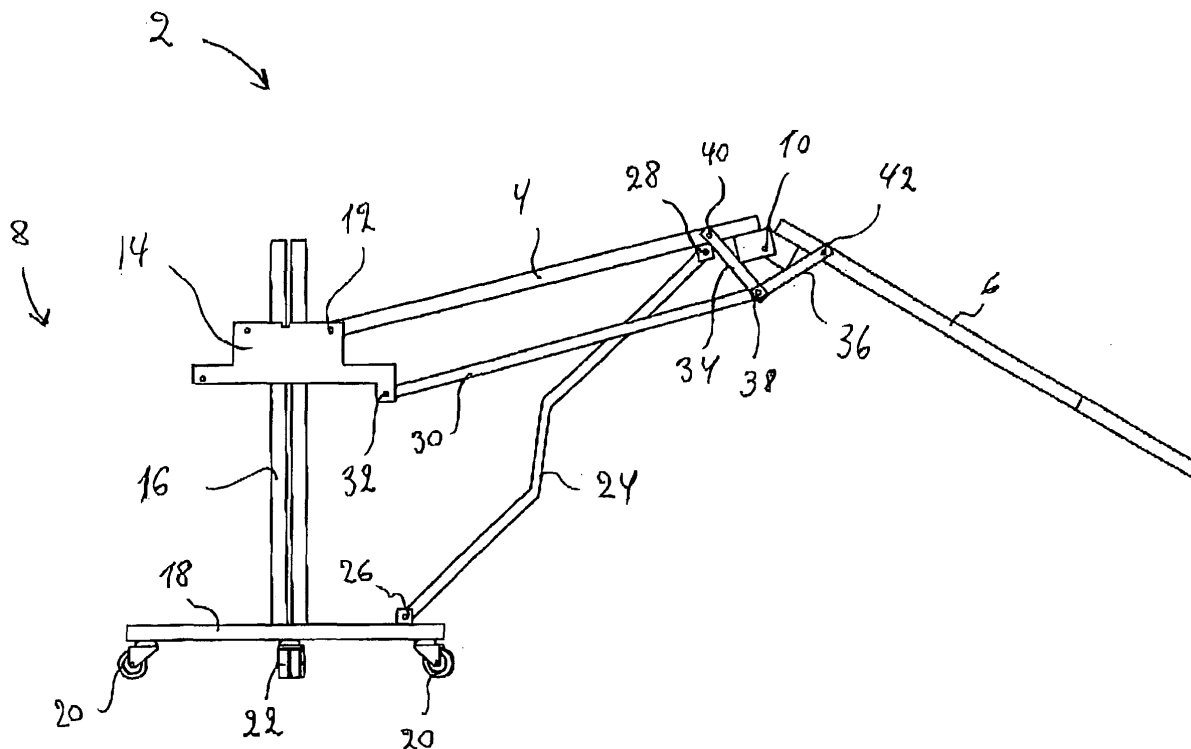


Fig. 1b

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Description

Field of the Invention

[0001] The present invention concerns a trampoline with a trampoline mat fastened to a surrounding frame for suspending the trampoline mat, and including a support for the frame, where the frame has at least two frame sections with a first, collapsed position for storing and moving the trampoline, and a second, unfolded position where the frame sections in the unfolded position are horizontal and the trampoline mat is suspended.

Description of Prior Art

[0002] Trampolines for sporting applications as compared with those developed for children's' play are often rather heavy and may therefore be difficult to tow from place to place, e.g. from a storage compartment to a sports centre. Therefore, there are some trampolines which are provided with a wheeled frame in order to facilitate towing.

[0003] In US 2,600,572 is described a foldable trampoline with a wheeled frame dividing the trampoline into two equally large parts. The trampoline is folded in such a way that the two parts will stand up along the frame with the legs folded down along the side.

[0004] In US 724,244 there is described a trampoline which also has a wheeled frame. The wheeled frame divides the trampoline into two equally large parts. The trampoline is collapsed by folding the two sides up against each other. Simultaneously with folding up the sides, the legs are hanging down along the sides.

[0005] In US 3,156,318 discloses a trampoline which is substantially collapsed according to the same principle as the so-called Safelift® - trampoline from Continental®. This means that the ends and the legs are folded up around a centre piece which is subsequently rotated so that it stands vertically.

[0006] In EP 765 677 is described a trampoline track in connection with a carriage. The trampoline track is composed of sections according to the concertina principle. The carriage furthermore has a wire drive with a wire with a handle which is connected with the sections, where the wire drive may be used for facilitating the folding.

[0007] Common to the above trampolines is that by the folding and unfolding of the trampolines, quite a lot of physical strength is to be used, usually requiring action by two persons. Furthermore, individual parts of the trampolines are to be folded according to a very certain sequence which requires some expertise in order to avoid moments of danger during the handling of the trampoline. Since a folding trampoline has some joints and rods which are moving in relation to each other during folding or unfolding, there is furthermore a risk of getting limbs, such as fingers or hands, caught and squeezed.

[0008] This entails that schools, where often there is

only limited time for the gym periods and where often there is only one teacher available for the pupils, are dis-favouring trampoline gymnastics since neither teacher nor pupils have the required strength and expertise for handling the trampoline. Besides, the folding and unfolding procedure takes up much of the class time.

[0009] Also, in the more competitive trampoline gymnastics these problems with handling the trampolines appear.

Description of the Invention

[0010] It is therefore the purpose of the invention to provide a foldable trampoline which is easy to tow, and where the folding and unfolding procedure takes only short time, is simple, does not imply the previously mentioned hazards and may be performed by one person without using appreciable physical strength.

[0011] This purpose is fulfilled with a trampoline with a trampoline mat fastened to a surrounding frame for suspending the trampoline mat in the frame, and including a support for the frame, where the frame has at least two frame sections with a first, folded position for storing and moving the trampoline, and a second, unfolded position where the frame sections in the unfolded position are horizontal and the trampoline mat is suspended, where the trampoline is peculiar in that the trampoline includes electrically, hydraulically or pneumatically automatised means for unfolding and folding the frame, respectively.

[0012] By using automatised means it is possible that a person may actuate the automatics at a safe distance from the trampoline and is thus not subjected to the physical load or the moments of danger associated with folding or unfolding trampolines according to prior art. Even though the problem of moments of danger has been known for many years, one has refrained from using automatised means.

[0013] The automatics may e.g. include a remote control controlling the automatised means, which e.g. may include an electric, hydraulic or pneumatic actuator, or an electric wire drive. In connection with using electric means, it is possible to integrate the source of power, such as an accumulator/battery, in the trampoline, for example in connection with an underframe for supporting the frame. Thereby the trampoline becomes independent of an external source of power in the vicinity of the trampoline during the folding procedure.

[0014] In a specific embodiment, the support may include a frame which via a connection is connected with a frame section, and where an actuator is part of this connection. Such actuators with remote control are commercially available.

[0015] The connection may advantageously include a fitting which the actuator may be adapted to displace in relation to the frame. The frame sections may be rotatably fastened to the fitting, and the connection may include means which by displacing the fitting relatively to the

frame forces the frame section into a rotational movement in a rotary link. Hereby is achieved the simple effect that a displacement of the fitting in relation to the frame causes unfolding or folding of the trampoline. This is particularly advantageous in that it is not required to connect an actuator to the individual frame sections, but one may suffice to connect the actuator to the fitting, whereby is achieved a simple transmission of the forces to be used at the unfolding and folding from the actuator to the frame sections.

[0016] The means, which by displacement of the fitting relative to the frame forces the frame sections to a rotational movement in the rotary link, may include a first connecting rod which at one end is rotatably fastened to the frame and at its opposite end is rotatably fastened to a frame section. By this arrangement of the means there is achieved a simple control of the rotation of the frame sections around the rotary link when the fitting is displaced in relation to the frame.

[0017] The actuator may advantageously be arranged to displace the fitting mainly vertically in relation to the frame. The displacing may e.g. occur along a pair of supports which in an embodiment may include a substantially vertical pipe or column. In other alternative embodiments, the supports may include a pair of U-sections or T-sections. In a practical embodiment, the trampoline assumes its unfolded position when the fitting is in the top position, and the folded or collapsed position when the fitting is in its bottom position.

[0018] The frame may be provided with wheels for easy towing of the trampoline. In an alternative embodiment, the fitting may be equipped with wheels which are arranged for contact with the floor only when the fitting is lowered to a bottom position in relation to the frame. When the fitting is displaced upwards, the wheels move upwards, whereby the frame will be supported on the floor. The frame may be provided with skid-proof legs, whereby it is achieved that the frame and thereby the trampoline are standing safely on a base when the trampoline is unfolded. However, the trampoline rests on the wheels of the frame when the trampoline is folded. It is thus not necessary to equip the wheels with strong locks, as the wheels do not have to hold the trampoline in position during use, but only keep in place during storage, e.g. in a depot.

[0019] A trampoline according to the invention may in a second embodiment include two pairs of frame sections at opposite sides of the frame, where each pair of frame sections have an inner frame section and an outer frame section in continuation of each other, where the inner frame section is the frame section closest to the frame. The inner and the outer frame section of each pair may be interconnected in a pivot joint so, when folding the trampoline, as to dispose the inner and the outer frame section opposite each other in an at least approximately vertical position. Dividing the frame into several parts at each side of the frame causes that the frame sections may be collapsed to a smaller size so that the height of

the trampoline in collapsed state is substantially taking up one quarter of the length of the entire frame. One may thus use a longer frame without at the same time providing a trampoline which in the folded state has greater height than a standard doorway.

[0020] In an embodiment with two frame sections at each their side of the frame, the means, which by displacement of the fitting relative to the frame forces the frame sections to a rotational movement in the rotary link, may include a second connecting rod which at one end is rotatably fastened to the fitting and at its opposite end is rotatably fastened to the ends of two short rods, of which one short rod is rotatably fastened at its opposite end to the inner frame section, and the second short rod is rotatably fastened at its opposite end to the outer frame section. By simple means is hereby achieved a coordination of the folding of the two frame sections.

[0021] In a further embodiment, the two short rods may be disposed in relation to each other so that they stand perpendicularly to each other while the trampoline is unfolded. Hereby is achieved a symmetric folding of the trampoline as the outermost end of the outer frame section is lowered substantially the same distance as the fitting is lowered in relation to the frame, if the lengths of the two frame sections are largely the same.

[0022] The electrically, hydraulically or pneumatically automatised means may advantageously be integrated in the frame, whereby a compact construction may be achieved. These means may possibly be integrated in the component parts of the frame in such a way that persons' inadvertent contact with these means is avoided, particularly when they are activated. Hereby the moments of danger associated with free-standing electrically, hydraulically or pneumatically automatised means or the wire drive in which there is a risk of getting limbs, such as fingers, caught are avoided.

[0023] The electrically, hydraulically or pneumatically automatised means may include an electrically, hydraulically or pneumatically powered spindle in a column as a part of the frame, and the fitting may be connected with the spindle via a nut which upon rotating the spindle moves longitudinally of the spindle. Hereby is achieved a simple way of elevating and lowering the fitting and thereby unfolding and folding of the trampoline, where the trampoline may be unfolded and folded while using a relatively small motor power.

[0024] In the collapsed state, the trampoline may have height and width dimensions which are less than a standard door opening, thus facilitating towing of the trampoline when it is used in buildings provided with standard doors with a typical height of two metres and a width of one metre. It is thus not required to mount special doors in the buildings where it is desired to use the trampoline.

Short Description of the Drawing

[0025] The invention is described in more detail with reference to the drawing, where:

Fig. 1 shows part of an embodiment of a trampoline according to the invention, where the various sub-figures show different positions of the frame sections;

Fig. 2 shows a second embodiment of a trampoline according to the invention;

Fig. 3 shows the same embodiment as in Fig. 2, where the trampoline is partly folded;

Fig. 4 shows a trampoline according to the invention which is folded;

Fig. 5 shows a close-up view of a part of a trampoline according to the invention.

Fig. 6 shows a close-up view of a second part of a trampoline according to the invention; and

Fig. 7 shows a close-up view of a locking pin for the support rods.

Detailed Description of the Invention

[0026] In the following description, some features are not in all the Figures for the sake of clarity. Identical elements in different Figures of the drawing will be provided with the same designations. Thus no explanation of these will be given in connection with each single Figure.

[0027] Fig. 1a to Fig. 1d show part of an embodiment according to the invention, consisting of a trampoline 2 where different positions of the frame sections 4 and 6 are shown. For the sake of clarity, the frame sections 4 and 6 are only shown at one side of the frame 8. The trampoline will substantially be symmetric about a line running through the centre of the frame, so that no essential information is lost by only showing half of the trampoline.

[0028] Fig. 1a shows a trampoline 2 according to the invention in its unfolded position, as seen from the side. The trampoline 2 has an inner frame section 4 and an outer frame section 6. The two frame sections 4 and 6 are substantially horizontal in this unfolded position. The frame sections 4 and 6 are mutually connected in a pivot joint 10, and the inner frame section 4 is connected to a fitting 14 via a rotary link 12. The frame 8 includes a column 16 which is fastened to a transverse beam 18 upon which there is mounted some wheels 20. The column 16 and the transverse beam 18 are connected to a similar column and transverse beam via the rail 22, of which only the end is visible.

[0029] The fitting 14 is movably connected to the frame 8 so that it may be displaced up and down along the column 16. The fitting 14 may in an embodiment be displaced along the column by means of an electric spindle in the column 16, as the fitting is connected to a nut on the spindle.

[0030] Between the transverse beam 18 of the frame 8 and the inner frame section 4 there is mounted a first connecting rod 24. At the first end, this first connecting rod 24 is suspended via a pivot joint 26 on the transverse beam 18, and at the opposite end it is suspended on the inner frame section 4 via a second pivot joint 28.

[0031] There is provided a second connecting rod 30 which at one end is rotatably fastened to the fitting 14 via a pivot joint 32, and at the other end is rotatably fastened to the ends of two short rods 34 and 36 via pivot joint 38. At its opposite end, one short rod 34 is rotatably fastened to the inner frame section 4 via a pivot joint 40, and at its opposite end, the second short rod 36 is rotatably fastened to the outer frame section 6 via a second pivot joint 42.

10 [0032] By connecting the frame sections 4 and 6 to the frame 8 and the fitting 14 via the said connecting rods 24, 30, 34 and 36, a simple control of the unfolding and folding of the trampoline is achieved.

15 [0033] Fig. 1b and Fig. 1c show the trampoline 2 in two partly folded positions, and Fig. 1d shows the trampoline in the folded position where the frame sections 4 and 6 are disposed opposite each other in an approximately vertical position. For the sake of clarity, not all details on Fig. 1d are numbered.

20 [0034] Due to the connecting rod 24, the inner frame section 4 is forced to perform a rotational movement in the rotary link 12 when the fitting 14 is displaced down or up along the column 16. When the fitting 14 is lowered, the second connecting rod 30 will force the two frame sections 4 and 6 via the short rods 34 and 36 to rotate about the pivot joint 10 in a controlled way. When the fitting 14 is lowered from its top position, the frame sections will be folded together due to the forced rotation about the pivot joint 10, so that they finally - i.e. when the fitting is in its bottom position - will stand approximately vertically opposite each other.

30 [0035] In the following description of Fig. 2 to Fig. 7, some objects will not be indicated with a reference number for the sake of clarity.

35 [0036] Fig. 2 shows a second embodiment of a trampoline according to the invention. The trampoline 2 is shown in its unfolded position. It includes a frame 8, a pair of frame sections 4 and 6 at each side of the frame 8 where each pair includes an inner frame section 4 and an outer frame section 6. The inner frame sections 4 are fastened to a fitting 14 at each end of the frame 8 via a couple of rotary links 12 on each fitting 14. The fitting 14 is movably connected to a column 16 so that it may be displaced up and down along the column 16. In connection with the fittings 14 there are provided a number of wheels 20 which do not engage the base when the trampoline is unfolded.

40 [0037] The frame sections 4 and 6 suspend a trampoline mat 44, and the inner and outer frame sections 4 and 6 are connected in pairs to each other in a pivot joint 10. The frame 8 has a foot 46 resting on the base when the trampoline 2 is unfolded. Between the foot 46 and the inner frame sections 4 there are provided connecting rods 24, and between the pivot joint 10 and the base there are provided support legs 48. These support legs 48 are also connected to corresponding support legs at the other side of the trampoline 2 via a connecting rod 50. Between the connecting rod 50 and the outer end of

the outer frame section 6 there is provided a number of support rods 56. It appears that the support legs 48 are equipped with a number of feet 52 upon which the trampoline also rests in the unfolded state.

[0038] Fig. 3 shows the same embodiment of a trampoline 2 as in Fig. 2, where the trampoline is partly folded. In order to prevent that the feet 52 of the support legs 48 from skidding along the base during unfolding and folding of the trampoline 2, the support legs 48 are provided with rollers (not shown) which are disposed under the connecting rod 50. These rollers may be lowered against the base by means of a screw mechanism 49. The folding procedure is substantially the same as described in connection with Fig. 1.

[0039] Fig. 4 shows a trampoline 2 according to the invention which is folded. It appears that the frame sections 4 and 6 are disposed substantially vertically opposite each other and that the wheels 20 are engaging the base in this folded position, while the foot 46 of the frame 8 is elevated from the base. Since it is only the wheels 20 that are engaging the base when the trampoline is folded, it will be easier to tow it (2) while it (2) is folded.

[0040] Fig. 5 shows a close-up view of a part of a trampoline 2 according to the invention. On the Figure appears a pivot joint 10 connecting an inner frame section 4 with an outer frame section 6. It appears that a support leg 48 is also connected to the pivot joint 10. Besides, a part of the second connecting rod 30 appears which via two smaller rods 34 and 36 are connected to the inner 4 and the outer frame section 6. In the second end, the second connecting rod 30 is pivotably connected to the frame which is shown on Figs. 1-3. In order to ensure correct disposition of the support leg 48 during unfolding the trampoline, a spring 54 is provided between the support leg and the outer frame section 6.

[0041] Fig. 6 shows a second close-up view of a detail of a trampoline 2 according to the invention. Here is seen a better representation of a support rod 56. It appears that the support rod 56 is divided into two parts which are pivotably connected in a pivot joint 58. Hereby is achieved that the support rod 56 may be folded during the folding of the trampoline 2. In unfolded condition, two members of the support rod will be in continuation of each other.

[0042] In order to avoid possible moments of danger when using the unfolded trampoline 2, the pivot joint 58 is equipped with a locking pin 60 which is shown on Fig. 7. When the trampoline is unfolded, the support rod 56 may be secured by simply turning the locking pin 60, whereby the two parts of the support rod 56 are secured in continuation of each other. In addition, on the Figure is seen a part of the trampoline mat 44.

Claims

1. A trampoline (2) with a trampoline mat (44) fastened to a surrounding frame for suspending the trampoline mat (44), and including a support for the frame,

where the frame has at least two frame sections (4, 6) with a first, folded position for storing and moving the trampoline (2), and a second, unfolded position where the frame sections (4, 6) in the unfolded position are horizontal and the trampoline mat (44) is suspended, **characterised in that** the trampoline (2) includes electrically, hydraulically or pneumatically automatised means for unfolding and folding, respectively, the frame.

2. Trampoline (2) according to claim 1, **characterised in that** the electrically, hydraulically or pneumatically automatised means includes an electric, hydraulic or pneumatic actuator or an electric wire drive.
3. Trampoline (2) according to claim 2, **characterised in that** the support includes a frame (8) which via a connection is connected with a frame section (4), and where the actuator or the wire drive is part of this connection.
4. Trampoline (2) according to claim 3, **characterised in that** the connection includes a fitting (14) which the actuator is adapted to displace in relation to the frame (8), where the frame sections (4) are rotatably fastened to the fitting (14), and the connection includes means which by displacing the fitting (14) relative to the frame (8) forces the frame section (4) into a rotational movement in a rotary link (12).
5. Trampoline (2) according to claim 4, **characterised in that** the means, which by displacement of the fitting (14) relative to the frame (8) forces the frame sections (4) to a rotational movement in the rotary link (12), include a first connecting rod (24) which at one end is rotatably fastened to the frame (8) and at its opposite end is rotatably fastened to a frame section (4).
6. Trampoline (2) according to claim 4 or 5, **characterised in that** the actuator is arranged to displace the fitting (14) substantially in vertical direction relative to the frame (8).
7. Trampoline (2) according to any of claims 4 - 6, **characterised in that** the fitting (14) has wheels (20) which are adapted to be in contact with the floor when the fitting (14) is lowered to a bottom position relative to the frame (8).
8. Trampoline (2) according to any of claims 4 - 7, **characterised in that** there are two pairs of frame sections (4, 6) at opposite sides of the frame (8), where each pair (4, 6) has an inner frame section (4) and an outer frame section (6) in continuation of each other, where the inner frame section (4) is the frame section (4, 6) closest to the frame (8), and where the inner (4) and the outer frame section (6) of each pair

(4, 6) are interconnected in a pivot joint (10) so, when folding the trampoline (2), to dispose the inner (4) and the outer frame section (6) opposite each other in an at least approximately vertical position.

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9. Trampoline (2) according to claim 8, **characterised in that** the means, which by displacement of the fitting (14) relative to the frame (8) forces the frame sections (4) to a rotational movement in the rotary link (12), include a second connecting rod (30) which at one end is rotatably fastened to the fitting (14) and at its opposite end is rotatably fastened to the ends of two short rods (34, 36), of which one short rod (34) is rotatably fastened at its opposite end to the inner frame section (4), and the second short rod (36) is rotatably fastened at its opposite end to the outer frame section (6).
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10. Trampoline (2) according to any preceding claim, **characterised in that** the electrically, hydraulically or pneumatically automatised means are integrated in the frame (8).
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11. Trampoline (2) according to any preceding claim, **characterised in that** the electrically, hydraulically or pneumatically automatised means include an electrically, hydraulically or pneumatically powered spindle in a column (16) as a part of the frame (8), and the fitting (14) is connected with the spindle via a nut which upon rotating the spindle moves longitudinally of the spindle.
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12. Trampoline (2) according to any preceding claim, **characterised in that** the trampoline (2) in the folded state and in direction between the supports has a dimension in height and width which is less than a standard door opening.
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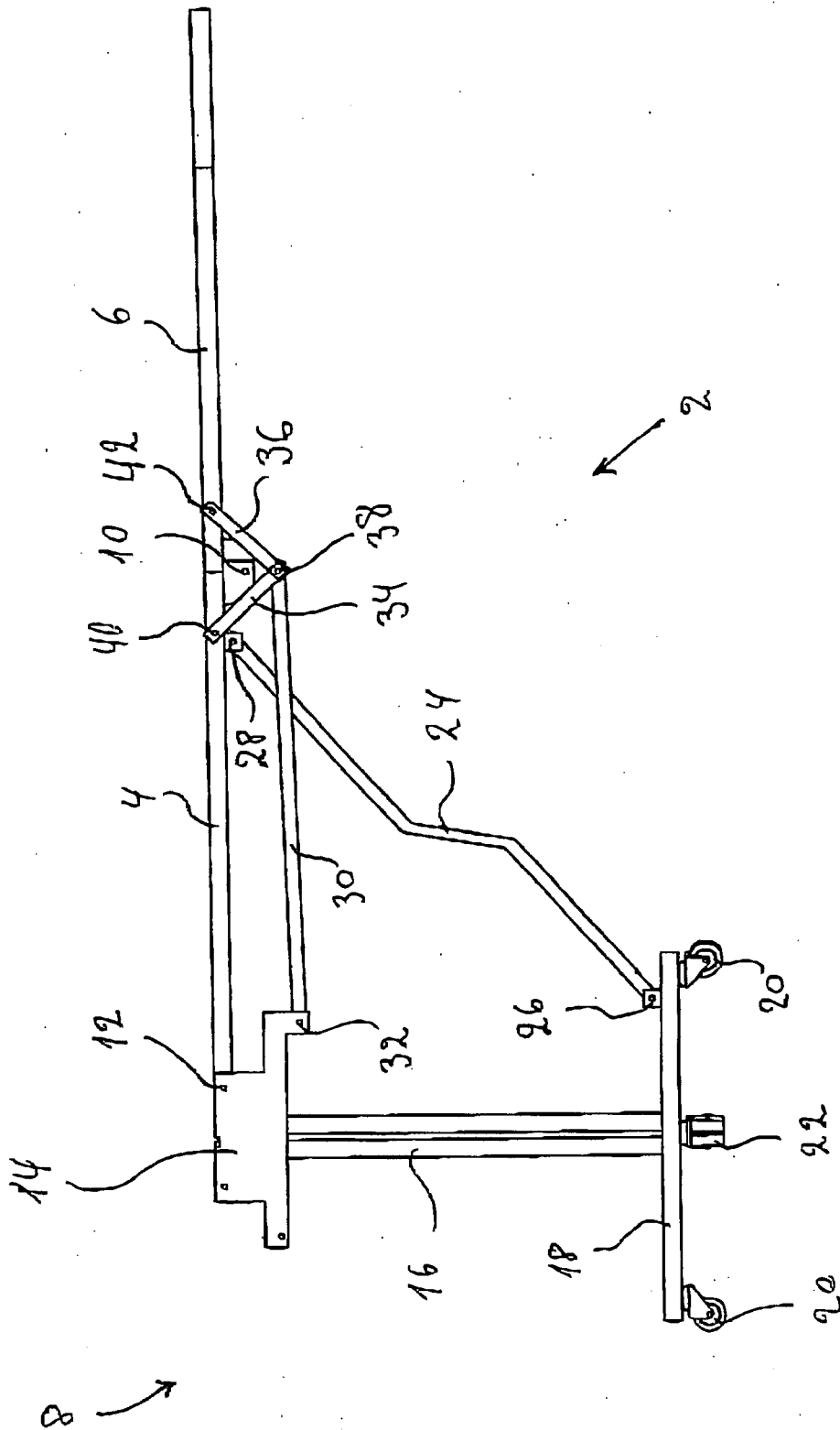


Fig 1a

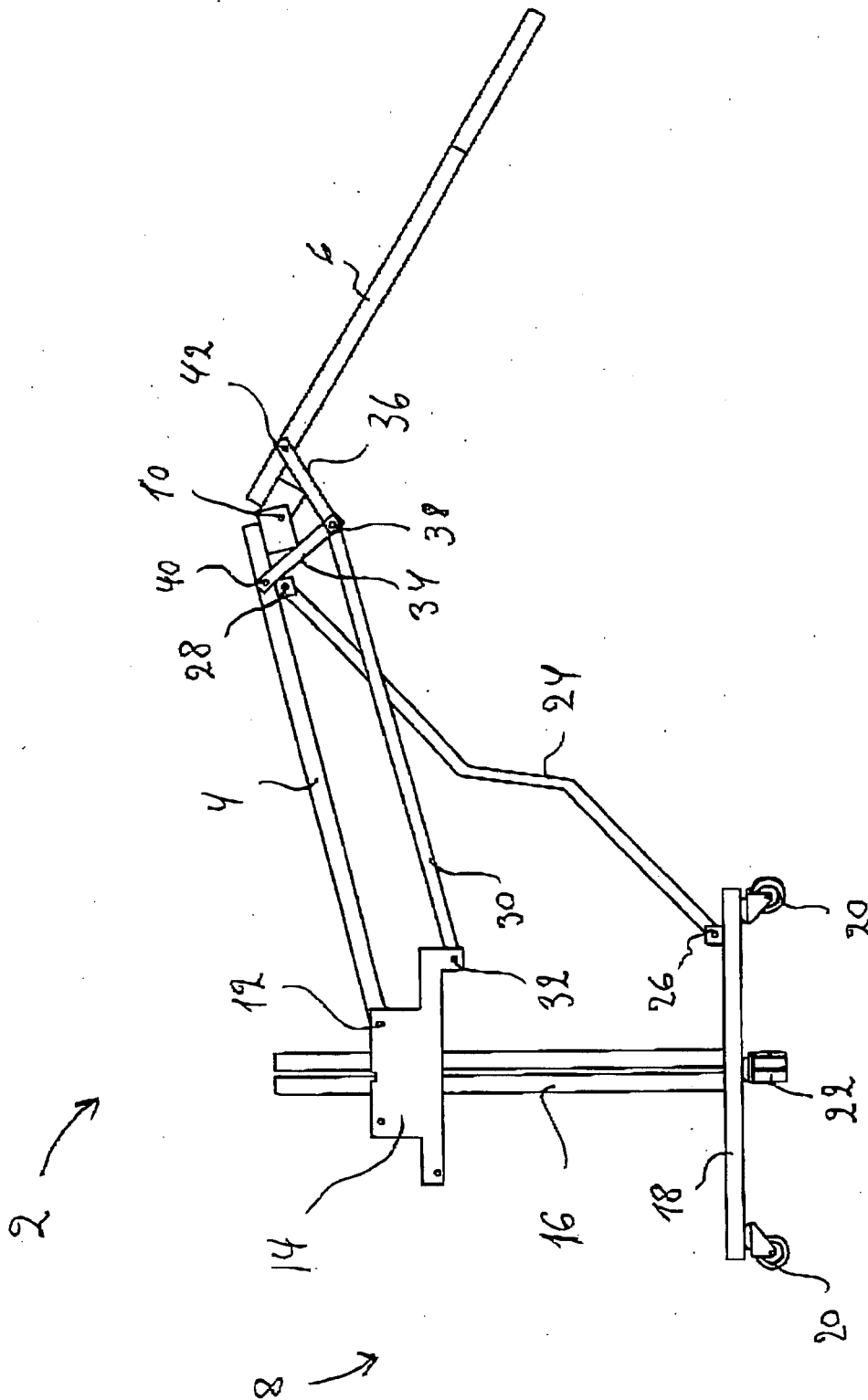


Fig. 1b

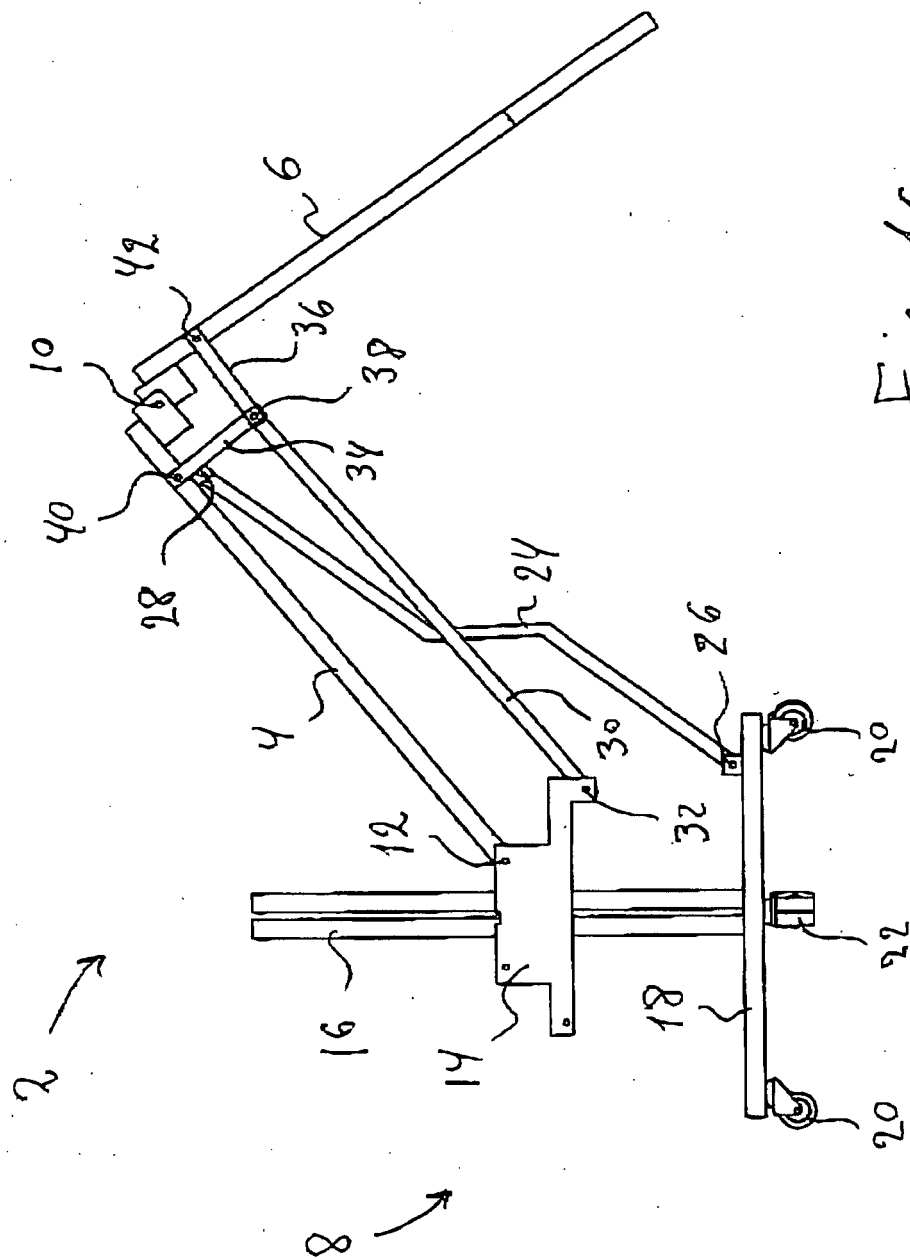


Fig. 1c

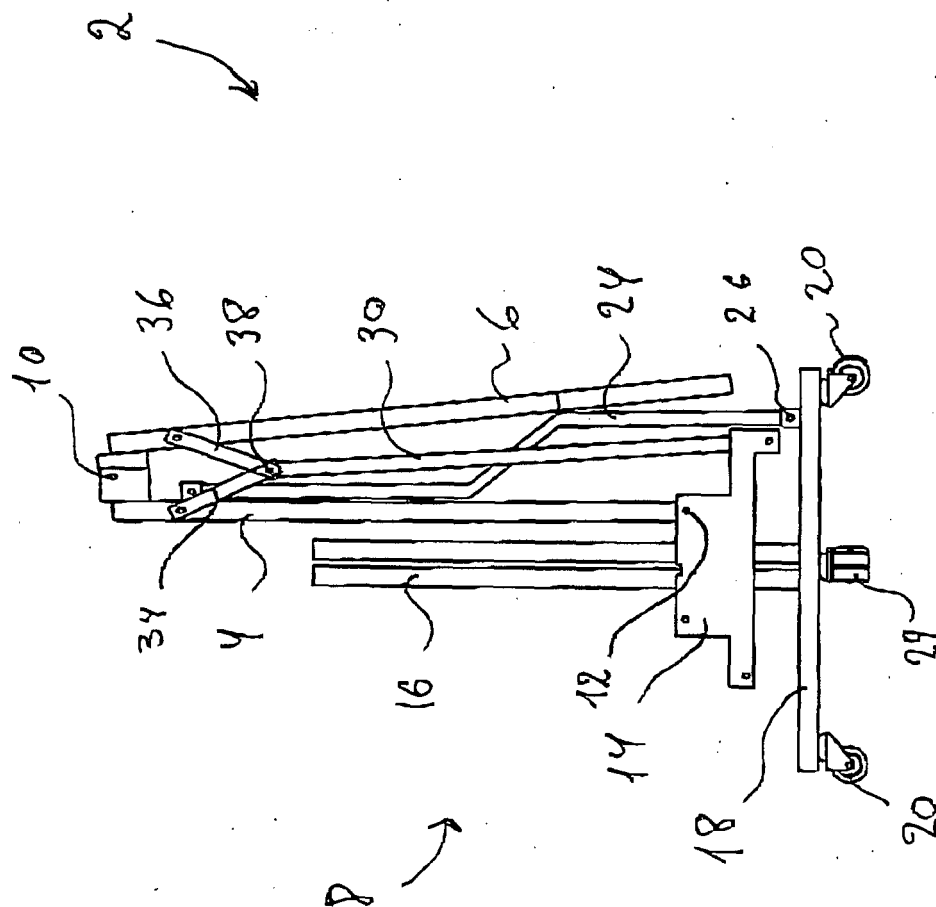


Fig. 1d

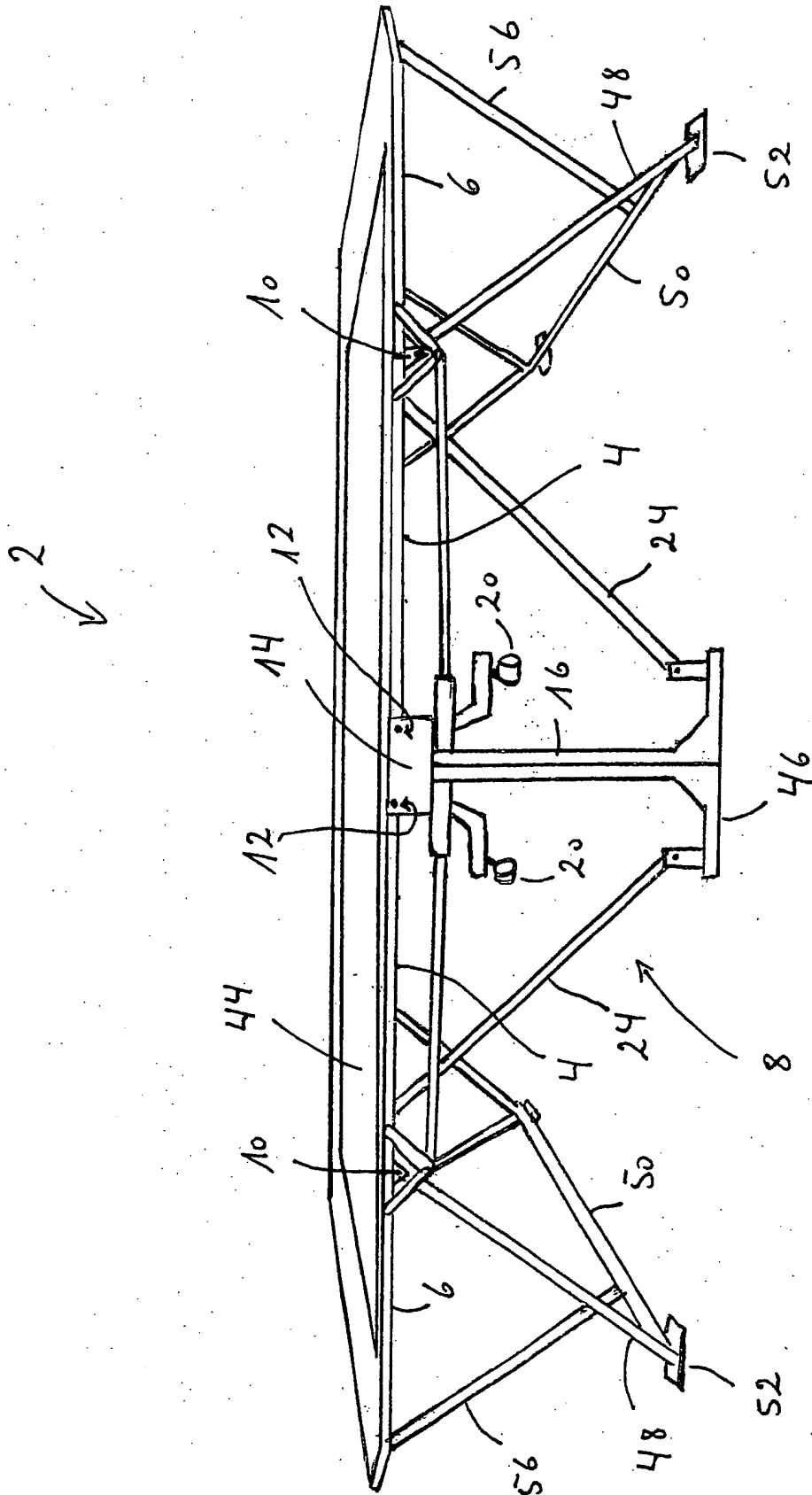


Fig. 2

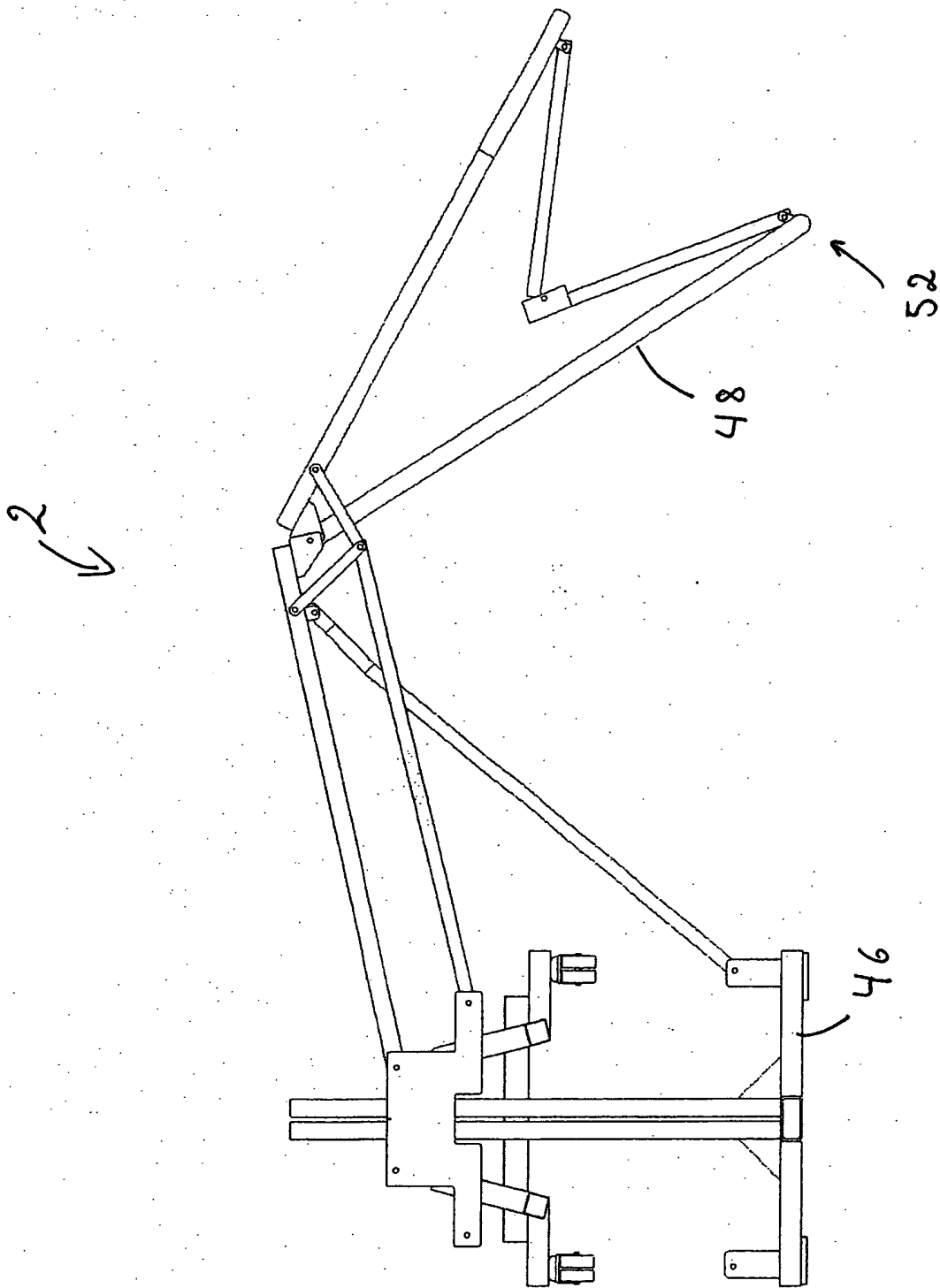


Fig. 3

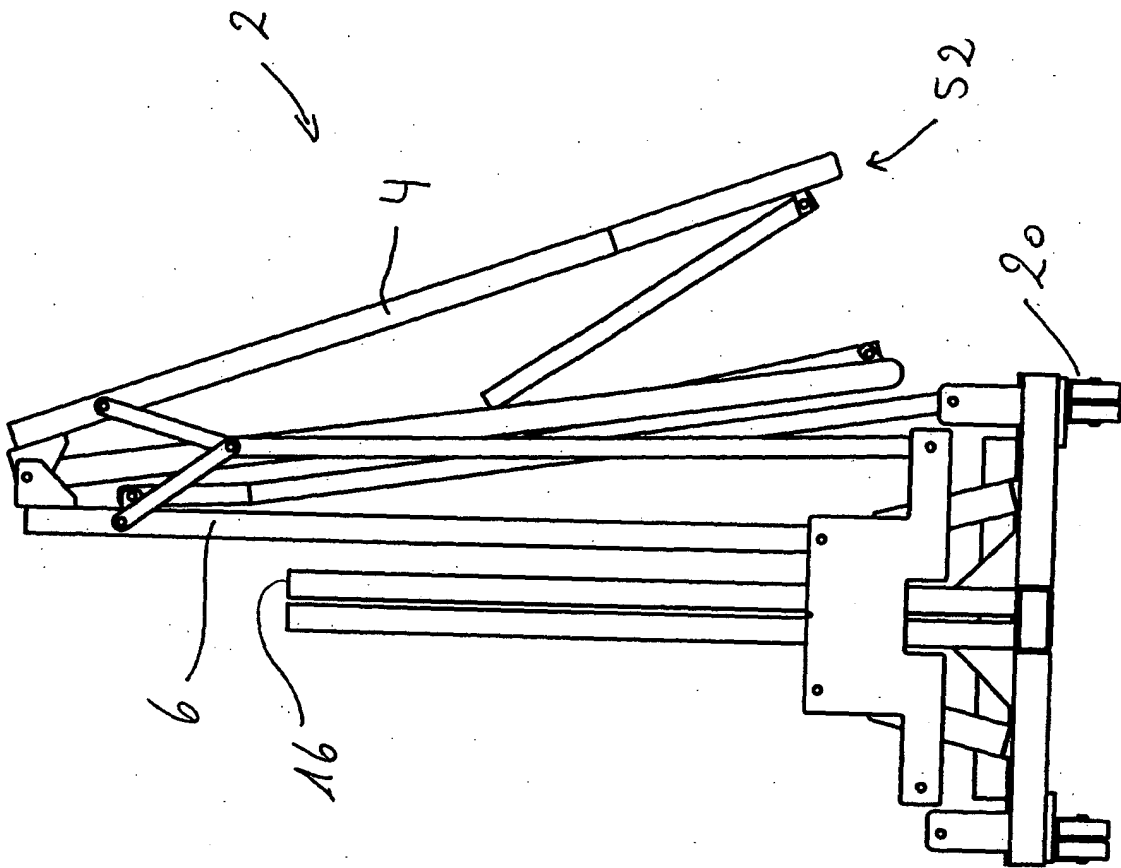


Fig. 4

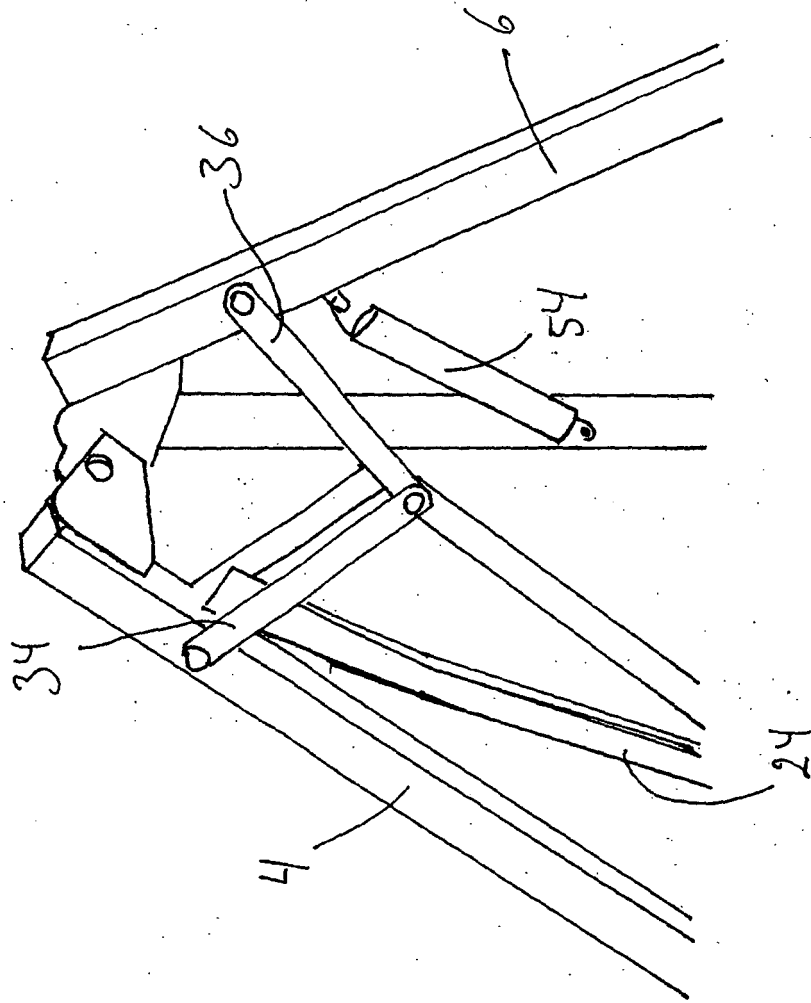


Fig. 5

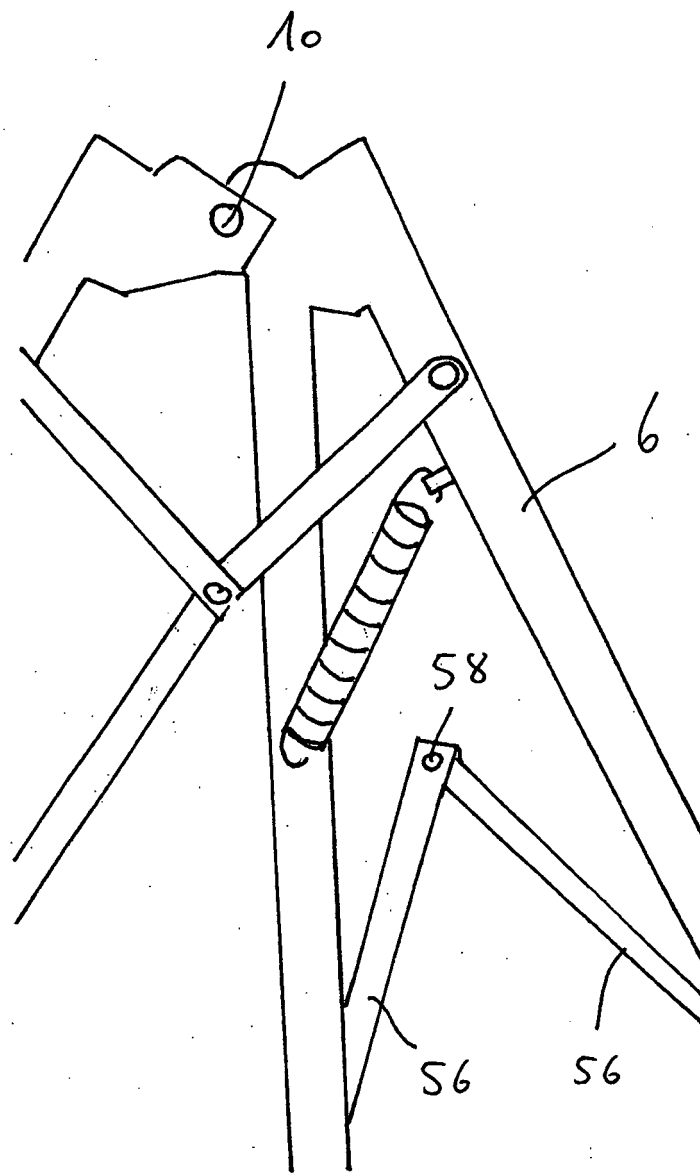


Fig. 6

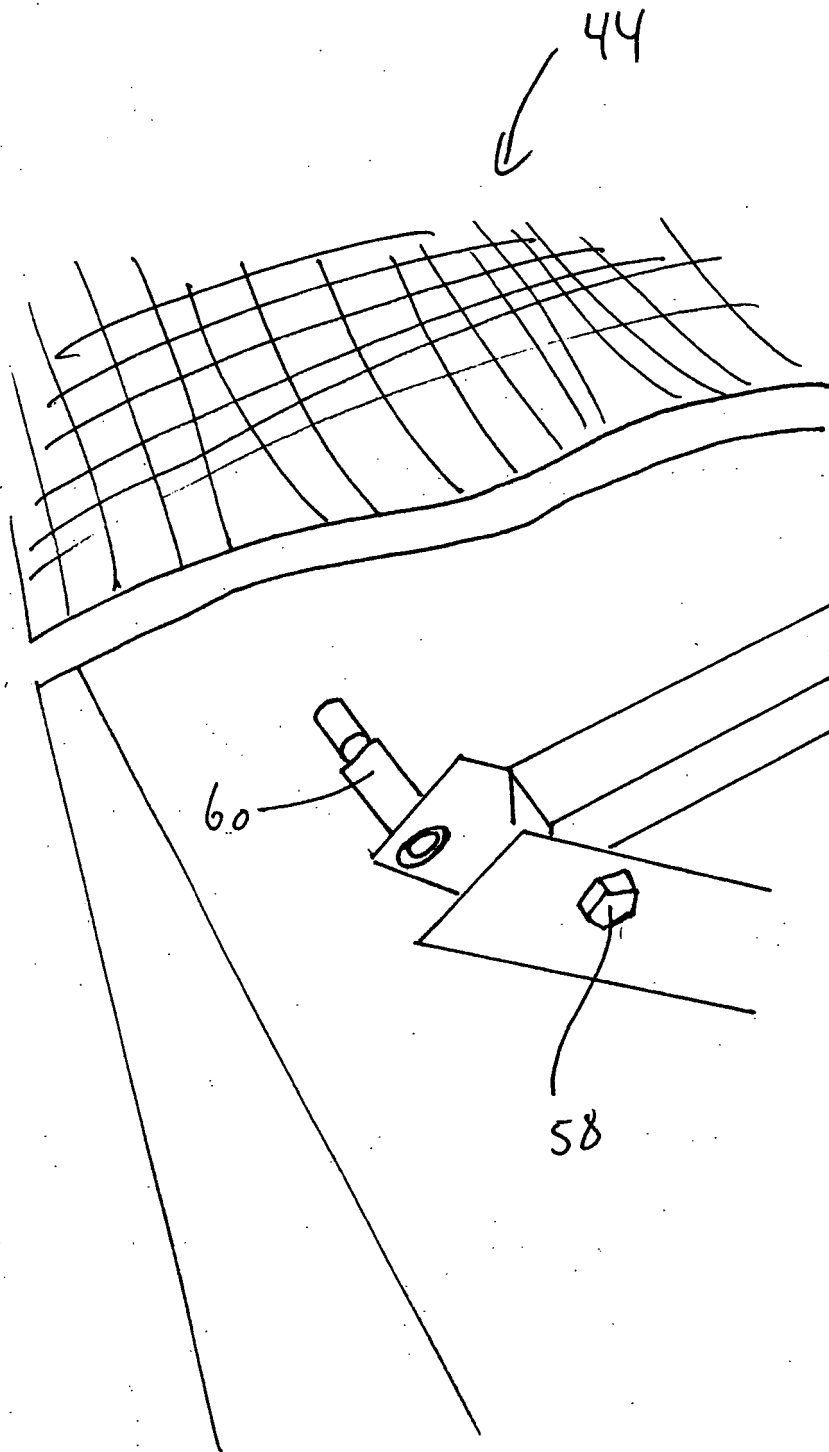


Fig 7.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	DE 200 00 028 U1 (KEMPFFLE, WOLFGANG) 7 September 2000 (2000-09-07) * page 2, paragraph 10; figures *	1-8, 10-12	
A	US 3 580 570 A (ROBERT M. FENNER ET AL) 25 May 1971 (1971-05-25) * figures *	1,3-5,7	
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			A63B A47C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 23 February 2006	Examiner Teissier, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 02 7628

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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23-02-2006

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