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(54) **An extension ladder assembly.**

(57) A ladder assembly (1) having a telescopic ladder (10) of lightweight tubular construction mounted on a trailer chassis (2). The ladder (10) has a bottom ladder section (12) pivotally mounted at one end of the chassis (2) for movement between a raised in-use position and a stored position against the chassis (2). A counter-weight (19) is attached at a lower end (18) of the bottom ladder section (12) to assist pivoting. A top ladder section (13) is slidable on the bottom ladder section (12). The top ladder section (13) has a pair of spaced-apart ladder sides (30) interconnected by rungs (32). A hollow anti-torsion bar (38), preferably of box-section, interconnects the rungs (32) substantially centrally located between the sides (30). A strut framework (50) pivotally connected at an upper end of the bottom ladder section (12) is engagable with strut receivers (56) at a front end of the chassis (2) to support the bottom ladder section (12) in the raised position. A bracing member (70) extends between the strut framework (50) and the bottom ladder section (13) to resist bending of the bottom ladder section (12) in use.

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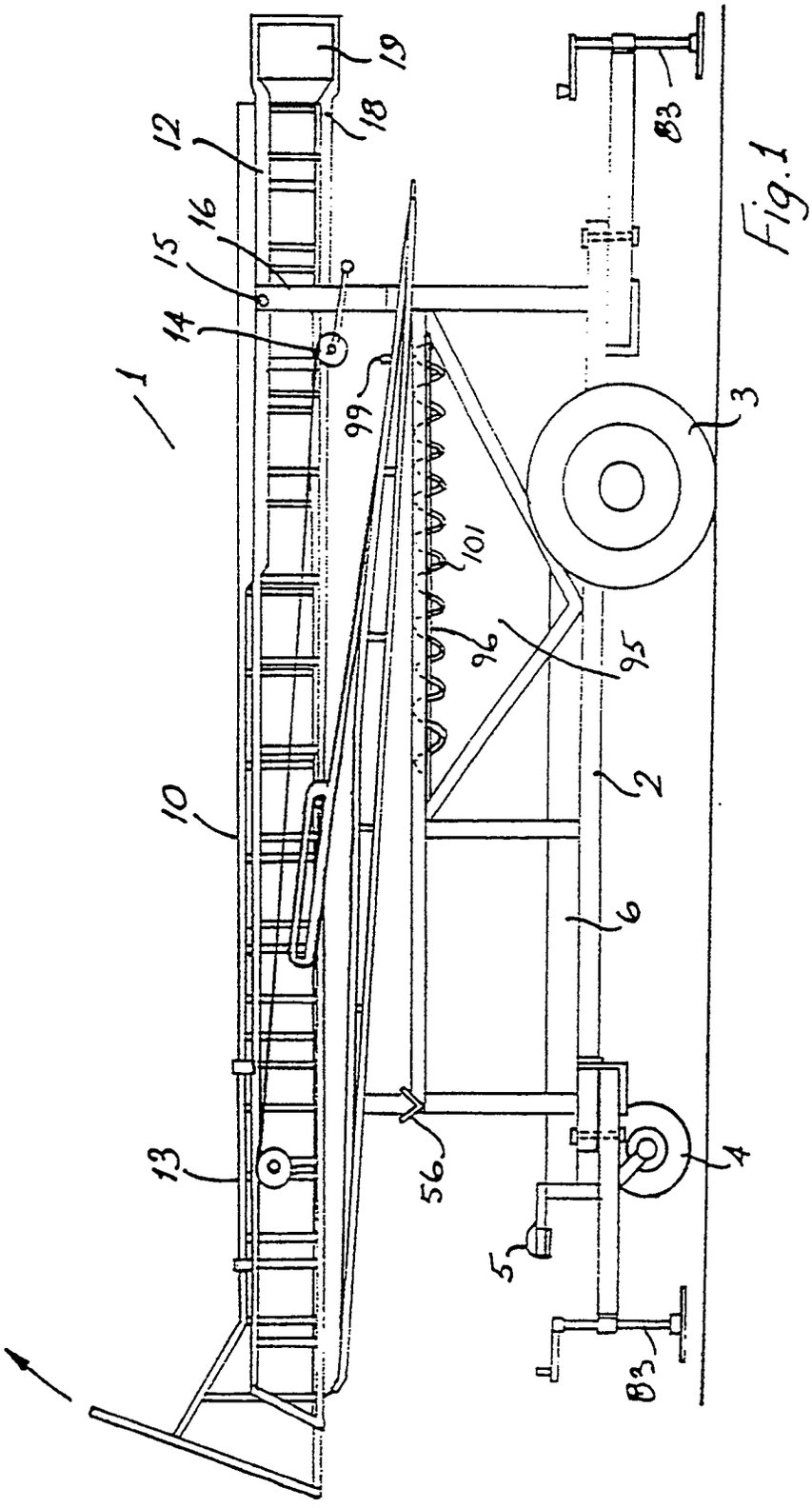
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Fig.1

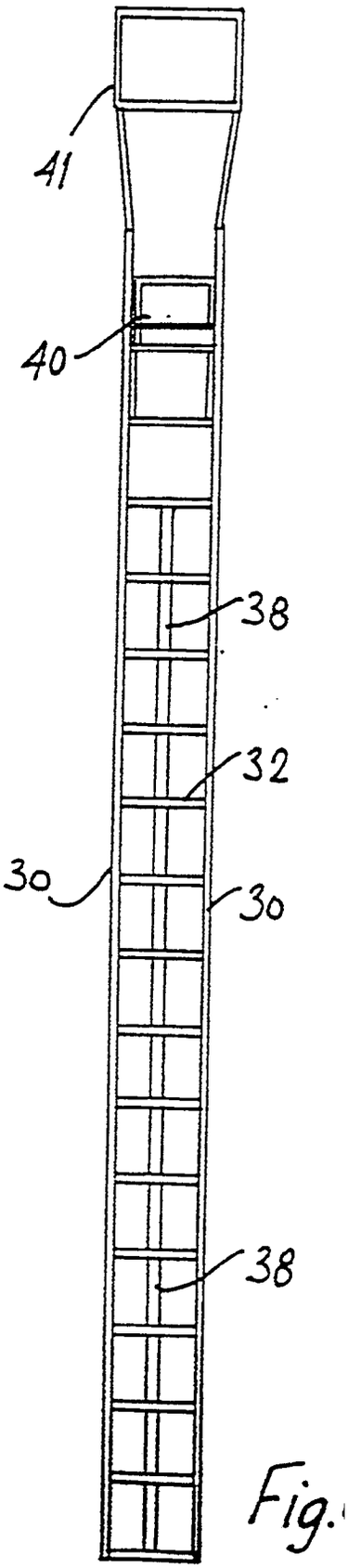
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Fig.

AN EXTENSION LADDER ASSEMBLY

This invention relates to an extension ladder assembly, and in particular to a self-supporting ladder assembly to be used, for example, for maintenance of street lamps, buildings and the like.

According to the invention there is provided a telescopically extendable ladder assembly of the type comprising a wheeled chassis, a bottom ladder section pivotable on the chassis between a collapsed stored position against the chassis and an erect in-use position on the chassis and one or more top ladder sections, each ladder section having a pair of spaced-apart ladder sides interconnected by rungs ; characterised in that there is provided a structure stabilising member interconnecting the rungs substantially centrally located between the sides of least a top ladder section. This particular construction allows the weight of the top ladder section to be kept low while maintaining strength and rigidity. Advantageously the construction resists twisting of the top ladder section during use. Preferably the stabilising member is a hollow anti-torsion bar. Ideally the hollow bar is of box-like section. Advantageously this construction resits both sway and torsion of the top ladder section while keeping down the weight of the top ladder section.

Preferably each ladder side is a framework formed by a pair of spaced-apart longitudinal members interconnected by a number of spaced-apart cross members. Preferably also the longitudinal members and rungs are all of hollow bar. This particular construction allows the weight of the top ladder section to be kept low while maintaining strength. To make the ladder secure for a person working at an upper end of the top ladder section there are three movements of the upper end of the top ladder section that have to be eliminated. Firstly bending of the upper end of the top ladder section relative to a lower end of the top ladder section about a transverse axis of the top ladder section. The relatively deep construction of ladder sides resists this bending. Further movement of the upper end of the top ladder section to be resisted is side sway and torque or twist of the upper end of the top ladder section. In some conventional ladders this is overcome by side-to-side strapping under the rungs. However, this bracing method would significantly increase the weight of the top ladder section. This problem has now advantageously been overcome by the provision of the tubular anti-torsion member, preferably of box-section material. This resists both sway and torsion of the top ladder section while maintaining low weight.

In another embodiment a bottom ladder section is pivotally mounted on the chassis spaced-apart from a lower end of the bottom ladder section to provide a short rearwardly extending portion, the short rearwardly extending portion incorporating a counterweight. This rearwardly extending portion with a counter-weight advantageously makes it easier to pivot the ladder on the chassis and the ladder can easily be pivoted between the collapsed stored position and the erect in-use position by a single person.

In another embodiment support means is provided for extension between the bottom ladder section and the chassis to maintain the ladder in the erect position, the support means comprising a strut framework pivotally attached adjacent an upper end of the bottom ladder section, the strut framework having a lower free end which is releasably engagable with a complementary strut receiver on the chassis remote from the pivotal mounting of the bottom ladder section. This ensures the bottom ladder section provides a rigid support for the top ladder section on the chassis.

Preferably a bracing member is provided extending between the lower end of the strut framework and spigots at each side of the bottom ladder section intermediate the ends of the bottom ladder section, the bracing member pivotally attached to the strut framework and having elongate slots which slidably engage the spigots to allow movement of the strut framework between a folded position against the bottom ladder section and a support position with the strut framework engaged in the strut receiver. The bracing member, when the ladder is in the erect position, advantageously supports the bottom ladder section resisting bending of the bottom ladder section in use when a person is on the top ladder section.

In another embodiment a chargeable motion damper is provided for the bottom ladder section to reduce speed of pivoting into the collapsed stored position and to assist raising. When collapsing the ladder on the chassis the motion damper advantageously guards against damage to the ladder and/or chassis which might occur if the ladder was dropped onto the chassis too quickly. It further advantageously assists in initially pivoting the bottom ladder section away from the stored position.

In a further embodiment a number of outriggers are pivotally mounted by pivot pins on the chassis, each outrigger having an associated locking pin spaced-apart from the pivot pin to releasably secure the outrigger against pivotal movement on the chassis, and an inner end of each outrigger being a close sliding fit between upper and lower guides on the chassis. This construction advantageously ensures there is minimum undesirable play at the pivot mounting of each outrigger.

Preferably a work platform is provided at an upper end of the top ladder section. The work platform is preferably pivotally mounted on the top ladder section

for movement between a stored position against the top ladder section and a laterally extending working position. Ideally the work platform incorporates a levelling device to adjust the level of the platform depending on the inclination of the ladder. It is also envisaged that a work tray be pivotally mounted at the free end of the ladder. Various tools may be incorporated and mounted on the ladder such as a winch for hauling materials from ground level to the work platform.

In a further embodiment a ladder stabiliser is provided on the ladder, the stabiliser extendable laterally of the ladder for engagement against a wall or the like support surface adjacent the ladder in use.

In a particularly preferred embodiment the wheeled chassis forms a trailer for towing behind a vehicle, a number of outriggers being provided on the chassis operable to support the chassis during use of the ladder, the ladder being of two-part construction having a bottom ladder section and a top ladder section slidably mounted on the bottom ladder section, a winch for raising the top ladder section on the bottom ladder section, catch means for releasably supporting the top ladder section in an extended position on the bottom ladder section, the bottom ladder section pivotally mounted adjacent an end of the chassis spaced-apart from a lower end of the bottom ladder section to provide a short rearwardly extending portion which incorporates a counter-weight, a strut framework pivotally attached adjacent an upper end of the bottom ladder section and having a lower free end which is releasably engagable with a complementary strut receiver on the chassis, locking means being provided to releasably secure the strut framework in engagement with the strut receiver, a bracing member pivotally attached at its bottom end to the lower end of the strut framework and having slots at a top end of the bracing member which are slidably engagable with spigots on each side of the bottom ladder section intermediate the ends of the bottom ladder section, and a work platform provided at an upper end of the top ladder portion, the work platform pivotable between a stored position against the top ladder section and a laterally extending working position.

In another aspect the invention provides a ladder section having a pair of spaced-apart ladder sides interconnected by rungs, characterised in that there is provided a structure stabilising member interconnecting the rungs substantially centrally located between the sides of the ladder section.

Preferably the stabilising member is a hollow anti-torsion bar. Ideally the hollow anti-torsion bar is of box-like section.

The invention will be more clearly understood from the following description of an embodiment thereof, given by way of example only, with reference to the accompanying drawings, in which :—

Fig. 1 is a diagrammatic side view of a ladder assembly according to the invention ;

Fig. 2 is a diagrammatic perspective view of the ladder assembly, showing the ladder assembly in an erect position ;

Fig. 3 is an elevational view of a lower ladder section of the ladder assembly ;

Fig. 4 is a side view of the lower ladder section of Fig. 3 ;

Fig. 5 is a detail perspective view of portion of the lower ladder section of Fig. 3 ;

Fig. 6 is an elevational view of a top ladder section forming portion of the ladder assembly ;

Fig. 7 is a side view of the top ladder section of Fig. 6 ;

Fig. 8 is a detail perspective view of portion of the top ladder section shown in fig. 6 ;

Fig. 9 is a detail diagrammatic partially sectioned elevational view of portion of a catch member on the bottom ladder section for engagement with the top ladder section ;

Fig. 10 is a detail diagrammatic side view of the arrangement of an operating lever for the catch member mounted on the side of the lower ladder section ;

Fig. 11 is a side view of a strut framework forming portion of the ladder assembly ;

Fig. 12 is an elevational view of the strut framework of Fig. 11 ;

Fig. 13 is a perspective view of a bracing member forming portion of the ladder assembly ;

Fig. 14 is a plan view showing a chassis forming portion of the ladder assembly ;

Fig. 15 is an end view of the chassis ;

Fig. 16 is a detail perspective view of portion of the ladder assembly ;

Fig. 17 is a detail diagrammatic perspective partially sectioned view of a chargeable motion damper forming portion of the ladder assembly ;

Fig. 18 is a diagrammatic elevational view showing the ladder assembly in use ;

Fig. 19 is a perspective view of a stabiliser for use with the ladder assembly ; and

Fig. 20 is an elevational view similar to Fig. 12 showing the stabiliser of Fig. 19 mounted on the strut framework.

Referring to the drawings there is illustrated a telescopically extendable ladder assembly indicated generally by the reference numeral 1. The ladder assembly 1 comprises a trailer chassis 2 with wheels 3, 4 and a tow-hitch 5. The tow-hitch 5 is attached to a beam 6 which is telescopically mounted on the chassis 2 for movement between the stored position illustrated in Fig. 1 and an extended position in which the beam 6 projects forwardly of the chassis 2 for attachment of the tow-hitch 5 to a vehicle. Pivotally mounted on the chassis 2 is an extendable ladder indicated generally by the reference numeral 10. The

ladder 10 is a two-part telescopic ladder having a bottom ladder section 12 and a top ladder section 13 slidably mounted on the bottom ladder section 12. A winch 14 is provided on the bottom ladder section 12 to raise the top ladder section 13 on the bottom ladder section 12. The ladder 10 is pivotal on the chassis 2 between a collapsed stored position against the chassis, as shown in Fig. 1 and an erect in-use position on the chassis as shown in Fig. 2.

The bottom ladder section 12 is pivotally mounted by pivot pins 15 on support arms 16 upstanding at a rear end of the trailer chassis 2. The pivot pins 15 engage the bottom ladder section 12 spaced-apart from a lower end 18 of the bottom ladder section 12 so that the lower end 18 forms a short rearwardly extending ladder portion on the chassis 2. The lower end 18 of the bottom ladder section 12 incorporates a counterweight 19.

Referring now in particular to Figs. 3 and 4 the bottom ladder section 12 is shown. The bottom ladder section 12 has a pair of spaced-apart bottom ladder sides 25 interconnected by rungs 26. Some of the rungs 26 on the bottom ladder section 12 may be formed as a step having a broad top formed by a plate or the like. Each side 25 has an upper longitudinal member 27 and a lower longitudinal member 28 joined by a number of spaced-apart intermediate members 29. The longitudinal members 27, 28 comprise a number of tubular steel sections ; the cross-section of the tubular steel sections reducing towards an upper end of the bottom ladder section 12. Preferably the longitudinal members are of box-section adjacent a lower end of the bottom ladder section 12. Each of the intermediate members 29 comprises a curved plate having flattened ends for attachment to the upper longitudinal member 27 and lower longitudinal member 28.

Referring now in particular to Figs. 6 to 8 the top ladder section 13 is shown. The top ladder section 13 has a pair of spaced-apart top ladder sides 30 interconnected by rungs 32. Each ladder side 30 is formed by a pair of spaced-apart tubular longitudinal members, namely, an upper longitudinal member 34 and a lower longitudinal member 35 interconnected by a number of spaced-apart cross members 36. A tubular box-section anti-torsion member 38 is centrally attached to an underside of the rungs 32 running substantially parallel to the sides 30.

At an upper end of the top ladder section 13 a foldable work platform 40 is provided, the work platform 40 being pivotal on the top ladder section 13 between a stored position against the top ladder section 13, as shown in Fig. 1 and a laterally extending working position as shown in Figs. 2 and 7. It will be noted that above the work platform 40 a safety hoop 41 is provided. In this case a winch 42 is mounted to the safety hoop 41 for raising and lowering materials from ground level up to the work platform 40.

In some cases the top ladder section may comprise two parts bolted together with an insulation block between the parts. Thus the top end of the ladder 10 and work platform 40 is electrically insulated from the ground.

Referring now in particular to Figs. 9 and 10 catch means for releasably supporting the top ladder section 13 in an extended position on the bottom ladder section 12 is shown. There is pivotally mounted at each side of the bottom ladder section 12 by brackets 45 and pivot pins 46 a latch 47 which is spring biassed against a stop 48 formed by one of the cross-members 29. Both latches 47 are pivotally interconnected by a link arm 49 for simultaneous operation of the latches 47. Connected to one latch 47 is a rod 52 which extends downwardly along a side of the bottom ladder section 12. As the top ladder section 13 is moved upwardly in the direction of arrow A, the latches 47 bear against each cross member 36 in turn and will be moved out of the way, immediately springing back into position. When, however, the top ladder section 13 is released and a cross member 36 falls slightly backwards in the reverse direction, then the latches 47 will bear against the stop 48 and the top ladder section 13 will be secured relative to the bottom ladder section 12. To lower the top ladder section 13 the latches 47 are released by pulling the rod 52 downwardly by means of a spring loaded operating handle 53 fixed adjacent a lower end of the bottom ladder section 12. Preferably a catch (not shown) is provided to hold the operating handle 53 in the open position. Thus, the latches 47 are held in the open position while the top ladder section 13 is lowered. Releasing the handle returns the latches 47 under the action of a spring 54, so the latches 47 bear against the stops 48.

Support means for the ladder is provided comprising a strut framework 50 (see Fig. 2) pivotally attached at 51 adjacent an upper end 52 of the bottom ladder section 12. A lower free end of the strut framework 50 is releasably engagable with a complementary strut receiver 56 at a front end of the chassis 2. Referring in particular to Figs. 11 and 12 the strut framework 50 is shown. The strut framework 50 has tubular side members 58 interconnected by tubular members 59. Lower ends 60 of the side members 58 terminate in a plate 63. Intermediate the lower ends 60 is a cross-bar 65. A U-shaped bracket 66 is attached to an underside of the cross-bar 65. Brackets 68 at upper ends of the side members 58 have through holes 69 for engagement with pivot pins at the upper end 52 of the bottom ladder section 12 thus forming the pivot mounting at 51. Each of the plates 63 at lower ends of the strut framework 50 engage with the strut receivers 56 on the chassis 2 which are V-shaped.

As can be seen from Fig. 2 a bracing member 70 extends between the lower end 60 of the framework

50 and spigots 71 at each side of the bottom ladder section 12 intermediate the ends of the bottom ladder section 12. The bracing member 70 is shown in Fig. 13 and is generally H-shaped having a pair of spaced-apart side members 74 connected intermediate their ends by a cross-member 75. At a lower end of each side member 74 is a through hole 76 to receive a bolt for pivotally securing the bracing member 70 to a lower end of the strut framework 50. Upper ends of the side members 74 each have an elongate slot 78 which slidably engages the spigots 71 on the bottom ladder section 12. This allows movement of the strut framework 50 between a collapsed position against the bottom ladder section 12 (as seen in Fig. 1) and a support position (Fig. 2) with the strut framework engaged with the strut receivers 56. It will be noted that in the erect position shown in Fig. 2 a top end 79 of each slot 78 engages against the spigot 71 to prevent bending of the bottom ladder section 12 in the direction B shown in Fig. 2, during use when a person is on the work platform 40.

Referring now to Figs. 14 and 15 the chassis 2 is shown and comprises a tubular support framework 80. At each corner of the framework 80 is pivotally mounted an outrigger 82 having a conventional ground engaging jack 83. Each outrigger 82 is mounted by a pivot pin 85 on the chassis 2. Each outrigger 82 has an associated locking pin 86 spaced-apart from the pivot pin 85 to releasably secure the outrigger 82 against pivotal movement on the chassis 2. An inner end 88 of each outrigger 82 is a close sliding fit between an upper guide 89 and lower guide 90 on the chassis 2 to allow substantially only lateral movement of the outrigger 82 relative to the chassis 2. This ensures the outriggers 82 are firmly supported on the chassis 2 with minimal undesirable slack movement. At a front end of the chassis 2 on top of the chassis are the V-shaped receivers 56 for the strut framework 50. A central upstanding post 92 is provided at a front end of the chassis. A spring loaded hook 93 on the post 92 engages with the bracket 66 on the strut framework 50 to form a locking means to releasably secure the strut framework 50 in engagement with the strut receivers 56.

Referring now in particular to Figs. 14 and 17, a chargeable motion damper indicated generally by the reference numeral 95 forming portion of the ladder assembly 1 is shown. The motion damper 95 is mounted at a top of the chassis 2 at a rear end of the chassis 2. The motion damper 95 comprises a channel section guide 96 having a central elongate slot 97. A block 98 is slidable along the guide 96. An upwardly directed peg 99 is provided on the block 98. Depending from the block 98 through the slot 97 is a spigot 100. A spring 101 extends between the spigot 100 and an anchor point 102 at a front end 103 of the guide 96. The block 98 is movable against spring pressure between a release position adjacent a front end 103 of the guide 96 and an extended charged position at a rear end 104 of the guide 96. As the lower ladder section 12 is dropped onto the chassis 2 the cross bar 65 of the strut framework 50 engages with the peg 99 moving the block 98 towards the charged position, the spring 101 damping the collapsing motion of the ladder 10. It will also be appreciated that when subsequently raising the ladder 10 the action of the spring 101 will assist the pivoting action of the ladder 10 on the chassis 2.

Referring now to Figs. 18 and 19 a ladder stabiliser 110 for use with the ladder assembly 1 is shown. The stabiliser 110 comprises a rod 112 having at each end a block or pad of wood 113 or the like material for engaging against a wall or other support surfaces adjacent the ladder in use. The rod 112 is slidably supported in brackets 116 on the strut framework 50, the brackets 116 having locking screws 117. Alternatively clamps may be used.

In use, the ladder assembly 1 can conveniently be towed behind a vehicle to a work site. It is easily manouvered by a single operator into position and with the outriggers extended the chassis 2 is raised clear of the ground so that it is supported on the outriggers 82 in conventional fashion. To raise the ladder 10, downward pressure is put on the lower end 18 of the bottom ladder section 12 adjacent the counter-weight 19 thus pivoting the ladder 10 about the pivot pins 15. As the ladder 10 is pivoted upwards the strut framework 50 drops downwards and the bracing member 70 pivots about the lower end of the strut framework 50 and slides along the spigots 71 at each side of the bottom ladder section 12. This ensures that the strut framework 50 is correctly positioned relative to the bottom ladder section 12 so that when the counter-weight 19 is released lower ends 54 of the strut framework 50 engage with the V-shaped receiver members 56 at a front end of the chassis 2. The hook 93 engages with the bracket 66 on the strut framework 50 to firmly hold the strut framework 50 in engagement with the receiver members 56. Then the top ladder scction 13 is winched upwardly on the bottom ladder section 12 to an extended position as shown in Fig. 2. It will be noted that the bracing member 70 provides rigidity to the structure and resits any bending of the bottom ladder section 12 in the centre due to the weight of an operator on the work platform 40. As shown in Fig. 17 an operator can then ascend to the work platform 40 to carry out repair or maintenance work. It will also be noted from Fig. 17 that the ladder 10 is sufficiently rigid to allow further persons to stand on the bottom ladder section 12 to carry out work such as decorating a side wall 120 of a building 121.

It will be appreciated that the construction of the ladder 10 is such that it combines relatively light weight with a rigid construction and the ladder 10 can easily be manipulated by a single operator. It is also of very simple construction and thus easy and cheap

and manufacture. Further, the only running gear is a winch to raise the top ladder section 13 on the bottom ladder section 12 and the winch for raising and lowering materials to the work platform. Thus it is very robust and reliable in operation.

It will further be appreciated that the ladder assembly particularly answers the age old problem in the building and painting industry of getting men and materials to a temporary but safe place above the ground for a relatively short duration, thus eliminating the laborious and tine-consuming job of erecting short-term scaffolding ant the exasperating problem of trying to move the whole thing especially on uneven, stepped or sloping ground. The ladder assembly provides a machine that can be manually operated and is very reliable and needs very little maintenance. It has a relatively long working life and is not expensive to produce and is of light weight construction. It can be raised to and lowered from the desired working position in seconds and can be easily manoeuvred by one man and is very simple in operation. The ladder assembly is extremely reliable, even after lying idle in even the most hostile of environments. It uses no rollers that could corrode, tracks and friction pads are used instead between the ladder sections. The ladder assembly has just two springs one on the locking means for strut framework and the other on the motion damper. Two all-weather winches are used one for raising the extension and one for lifting materials to the work platform. Preferably the ladder assembly is of steel hot sprayed with zinc to provide corrosion resistance. The machine has no batteries, no hydraulics and no switches which could provide reliability problems. The structure of the ladder is such that weight of the assembly is kept as low as possible while still maintaining the required strength and rigidity. The low weight is important to allow the easy raising and lowering of the ladder assembly on the chassis.

It will be appreciated that where two ladder assemblies are used a staging may be suspended from the work platforms to accomodate two or three people, the staging being mounted by pulley blocks hooked onto eyes on the platforms which have the effect of keeping the platforms in the vertical position thus preventing their use by an operator.

The invention is not limited to the embodiment hereinbefore described, which may be varied in both construction and detail.

Claims

1. A telescopically extendable ladder assembly (1) of the type comprising a wheeled chassis (2), a bottom ladder section (12) pivotable on the chassis (2) between a collapsed stored position against the chassis (2) and an erect in-use position on the chassis (2) and one or more top ladder sections (13), each ladder section (12,13) having a pair of spaced-apart ladder sides (25,30) interconnected by rungs (26,32); characterised in that there is provided a structure stabilising member (38) interconnecting the rungs (32) substantially centrally located between the sides (30) of at least a top ladder section (13).

2. A ladder assembly (1) as claimed in claim 1 wherein the stabilising member is a hollow anti-torsion bar (38).

3. A ladder assembly (1) as claimed in claim 2 in which the hollow bar (38) is of box-like section.

4. A ladder assembly (1) as claimed in any preceding claim wherein each side (25,30) is a framework formed by a pair of spaced-apart longitudinal members (27,28,34,35) interconnected by a number of spaced-apart cross members (29,36).

5. A ladder assembly (1) as claimed in any preceding claim wherein the bottom ladder section (12) is pivotally mounted on the chassis (2) spaced-apart from a lower end (18) of the bottom ladder section (12) to provide a short rearwardly extending portion, the short rearwardly extending portion incorporating a counter-weight (19).

6. A ladder assembly (1) as claimed in any preceding claim wherein support means is provided for extension between the bottom ladder section (12) and the chassis (2) to maintain the ladder (10) in the erect position, the support means comprising a strut framework (50) pivotally attached adjacent an upper end of the bottom ladder section (12), the strut framework (50) having a lower free end (63) which is releasably engagable with a complementary strut receiver (56) on the chassis (2) remote from the pivotal mounting of the bottom ladder section (12).

7. A ladder assembly (1) as claimed in claim 6 wherein a bracing member (70) is provided extending between the lower end of the strut framework (50) and spigots at each side of the bottom ladder (12) section intermediate the ends of the bottom ladder section (12), the bracing member (70) pivotally attached to the strut framework (50) and having elongate slots (78) which slidably engage the spigots to allow movement of the strut framework (50) between a folded position against the bottom ladder portion (12) and a support position with the strut framework (50) engaged with the strut receiver (56).

8. A ladder assembly (1) as claimed in any preced-

ing claim in which a chargeable motion damper (95) is provided for the lower ladder section (12) to reduce the speed of pivoting into the collapsed stored position and to assist raising.

9. A ladder assembly (1) as claimed in any preceding claim wherein a number of outriggers (82) are pivotally mounted by pivot pins (85) on the chassis (2), each outrigger (82) having an associated locking pin (86) spaced-apart from the pivot pin (85) to releasably secure the outrigger (82) against pivotal movement on the chassis (2), and an inner end of each outrigger being a close sliding fit between upper and lower guides (89,90) on the chassis (2).

10. A ladder assembly (1) as claimed in any preceding claim wherein the wheeled chassis (2) forms a trailer for towing behind a vehicle, a number of outriggers (82) being provided on the chassis (2) operable to support the chassis (2) during use of the ladder (10), the ladder (10) being of two part construction having a bottom ladder section (12) and a top ladder section (13) slidably mounted on the bottom ladder section (12), a winch (14) for raising the top ladder section (13) on the bottom ladder section (12), catch means for releasably supporting the top ladder section (13) in an extended position on the bottom ladder section (12), the bottom ladder section (12) pivotally mounted adjacent an end of the chassis (2) spaced-apart from a lower end (18) of the bottom ladder section (12) to provide a short rearwardly extending portion which incorporates a counterweight (19), a strut framework (50) pivotally attached adjacent an upper end of the bottom ladder section (12) and having a lower free end which is releasably engagable with a complementary strut receiver (56) on the chassis (2), locking means (93) being provided to releasably secure the strut framework (50) in engagement with the strut receiver (56), a bracing member (70) pivotally attached at its bottom end to the lower end of the strut framework (50) and having slots (78) at a top end of the bracing member (70) which are slidably engagable with spigots on each side of the bottom ladder section (12) intermediate the ends of the bottom ladder section (12), and a work platform (40) provided at an upper end of the top ladder section (13), the work platform (40) pivotable between a stored position against the top ladder section and a laterally extending working position.

11. A ladder section having a pair of spaced-apart ladder sides interconnected by rungs ; characterised in that there is provided a structure stabilising member interconnecting the rungs substantially centrally located between the sides of the ladder section.

12. A ladder section as claimed in claim 11 wherein the stabilising member is a hollow anti-torsion bar.

13. A ladder section as claimed in claim 12 wherein the hollow bar is of box-like section.

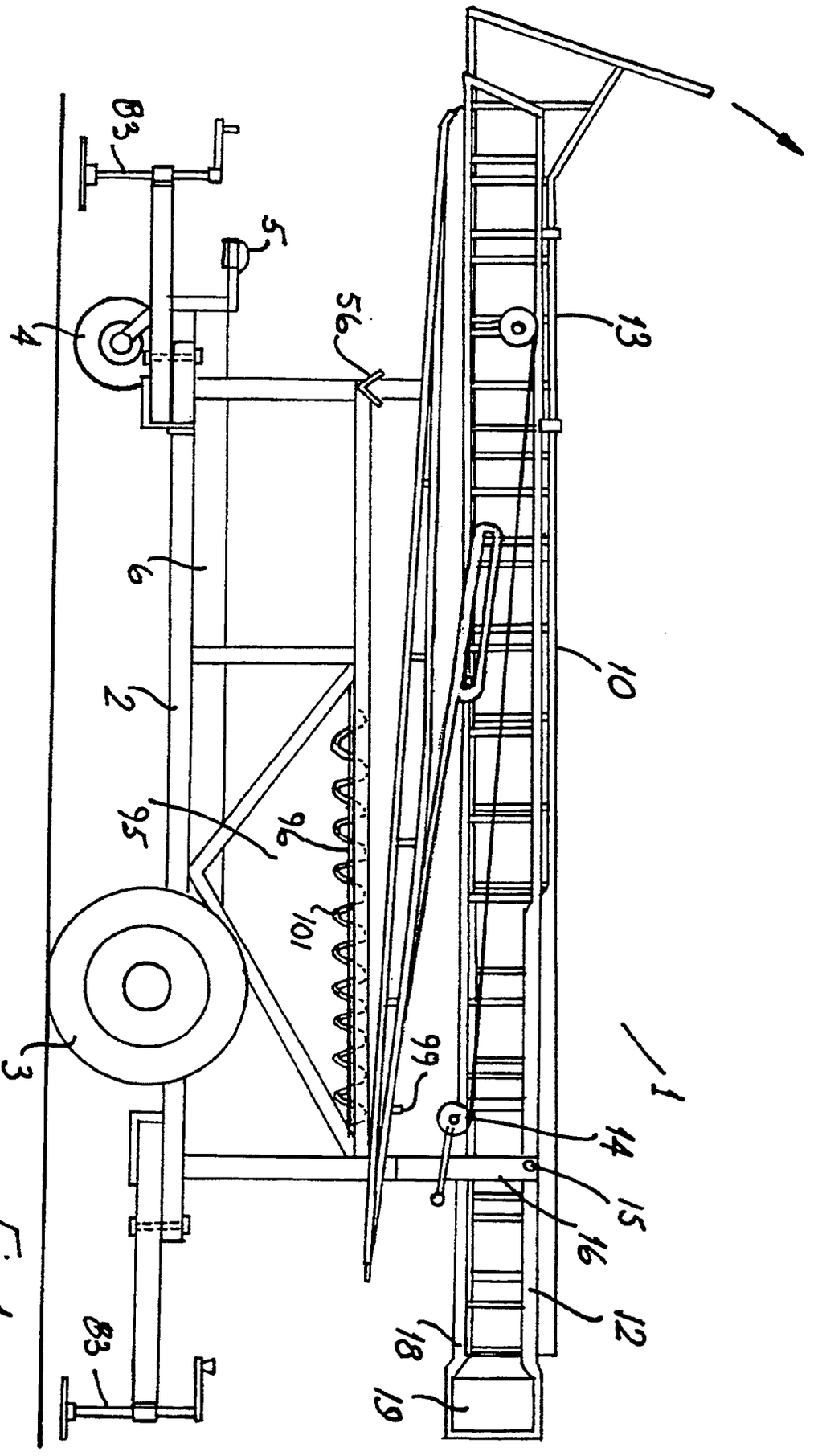

Fig. 1

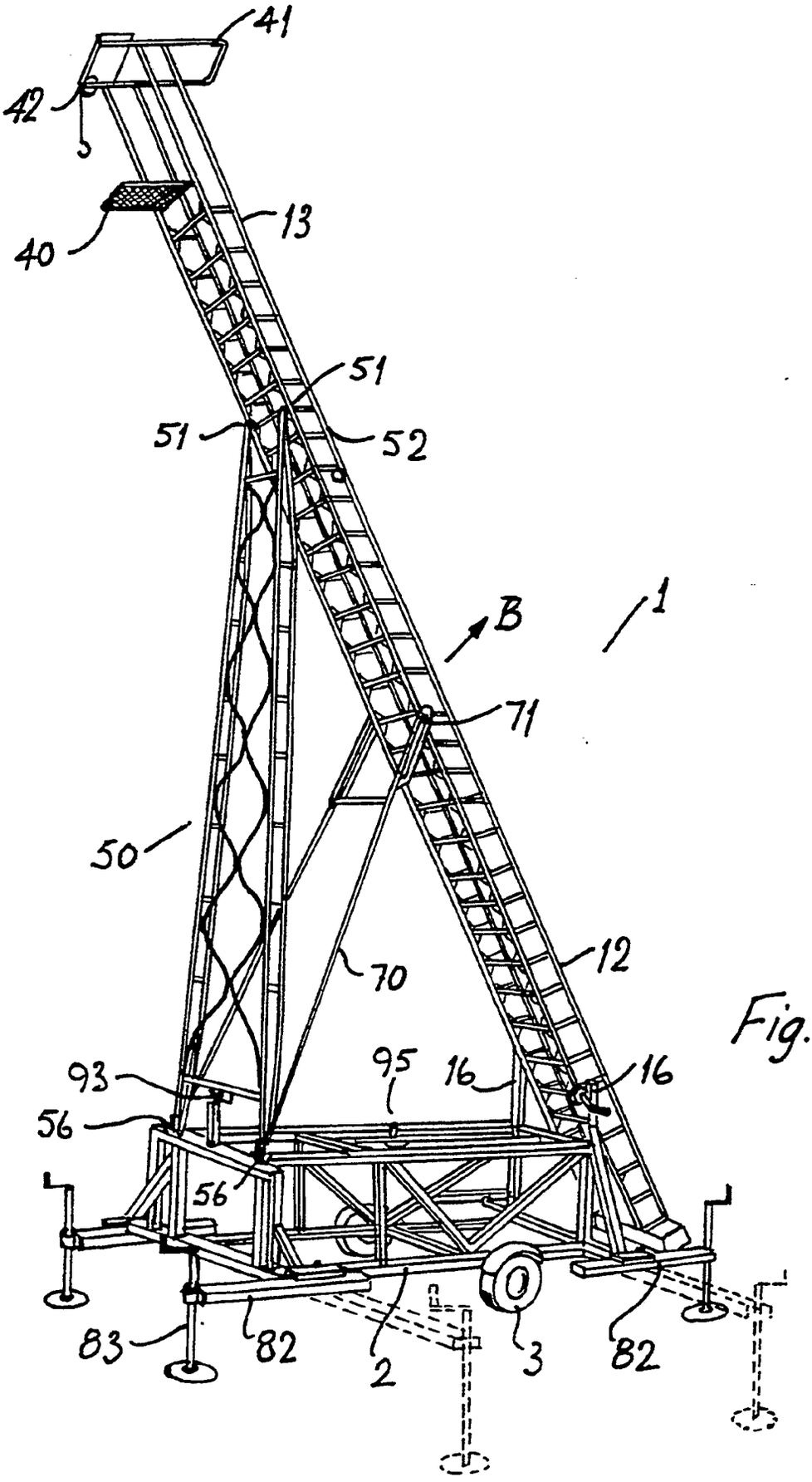

Fig.2

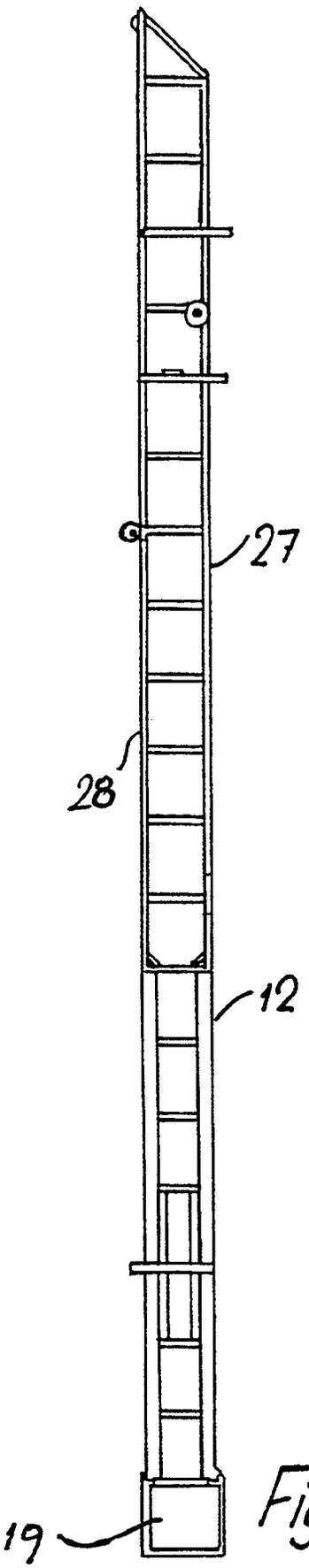

Fig.4

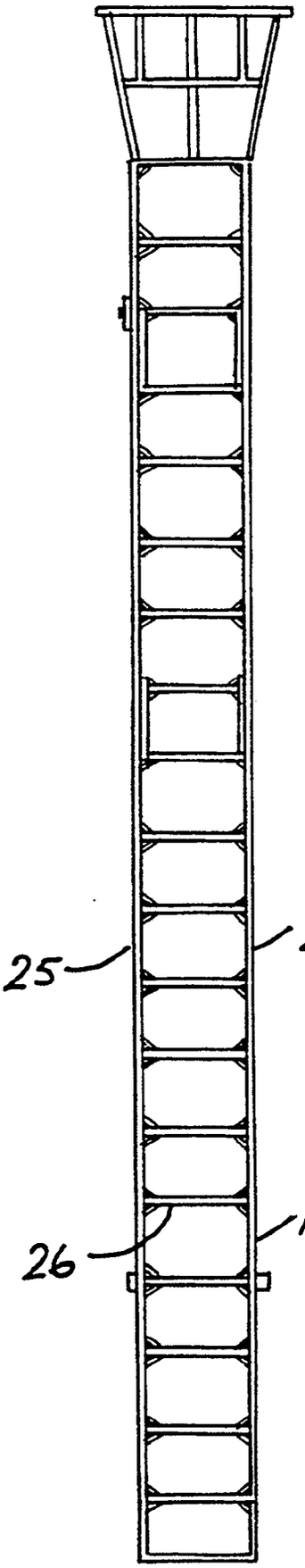

Fig.3

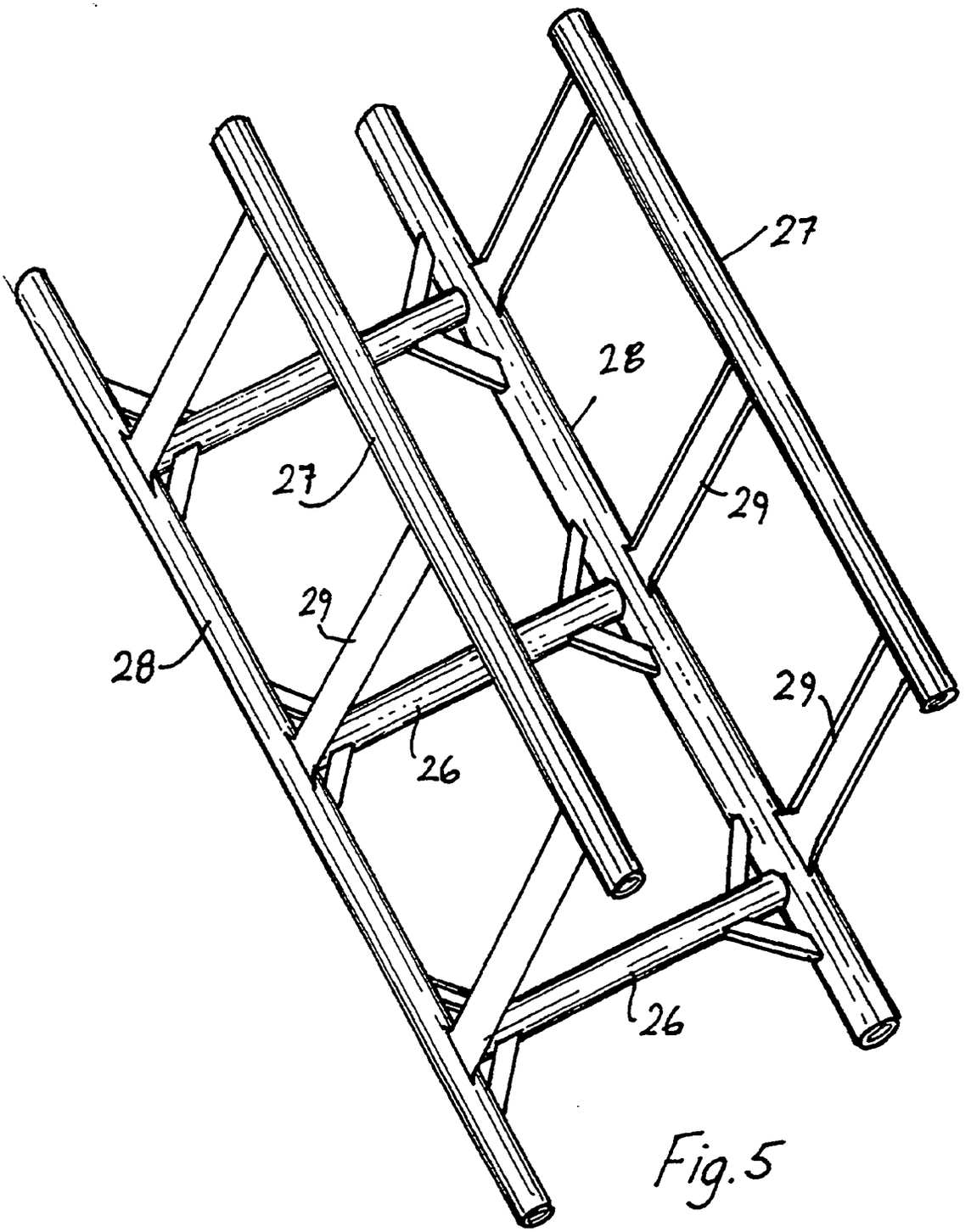

Fig.5

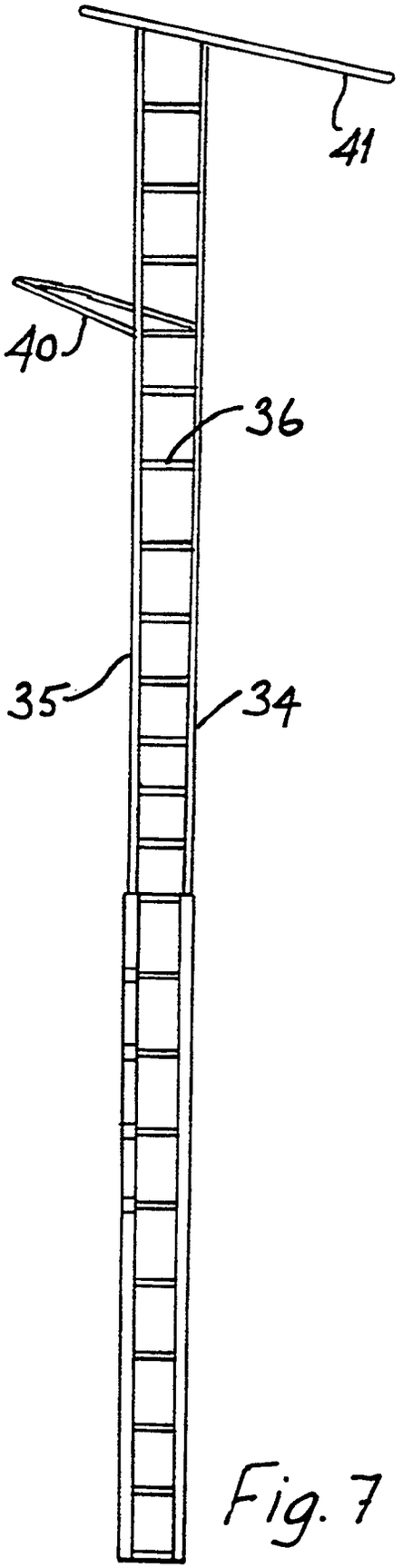

Fig. 7

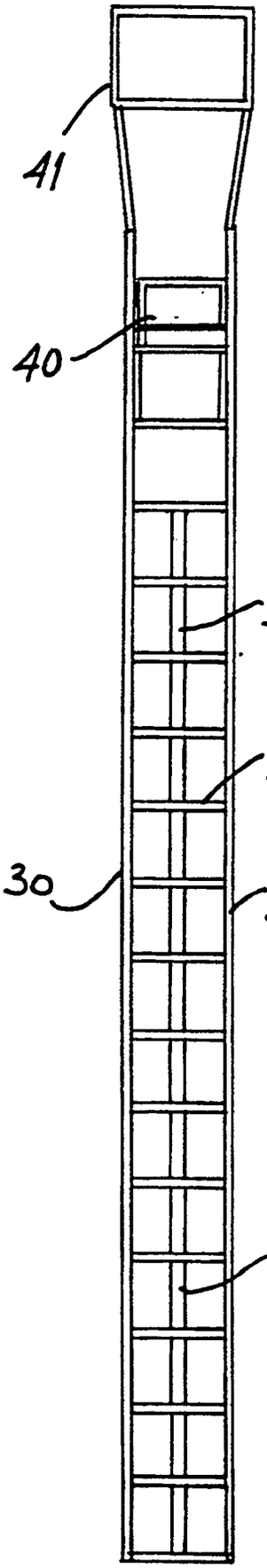

Fig.6

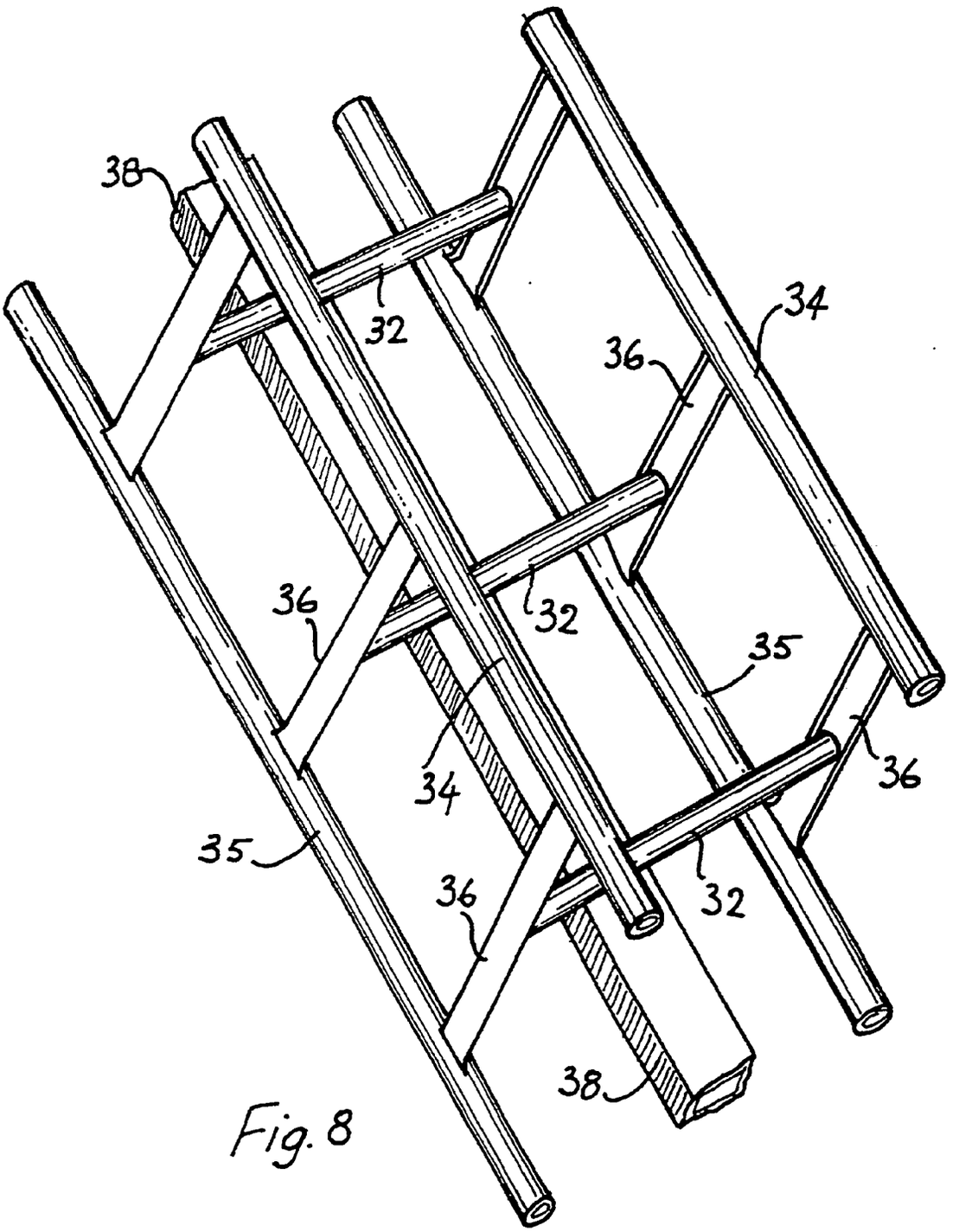

Fig. 8

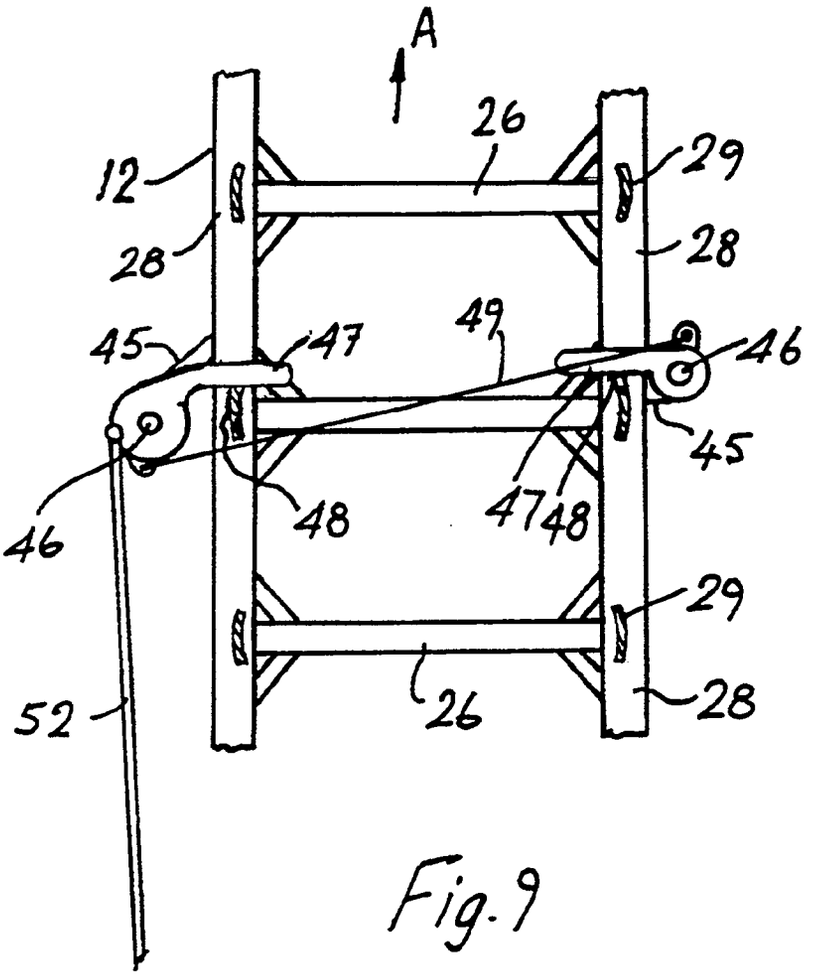

Fig. 9

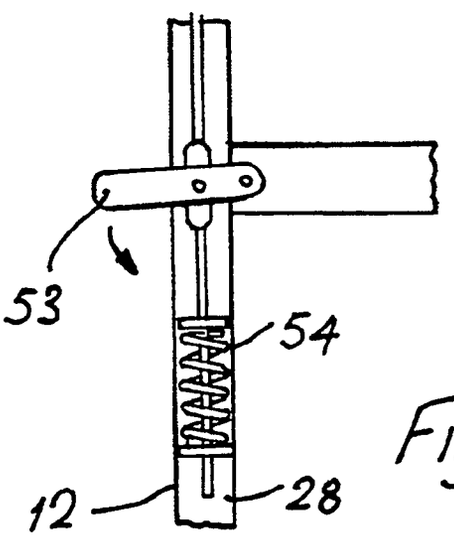

Fig. 10

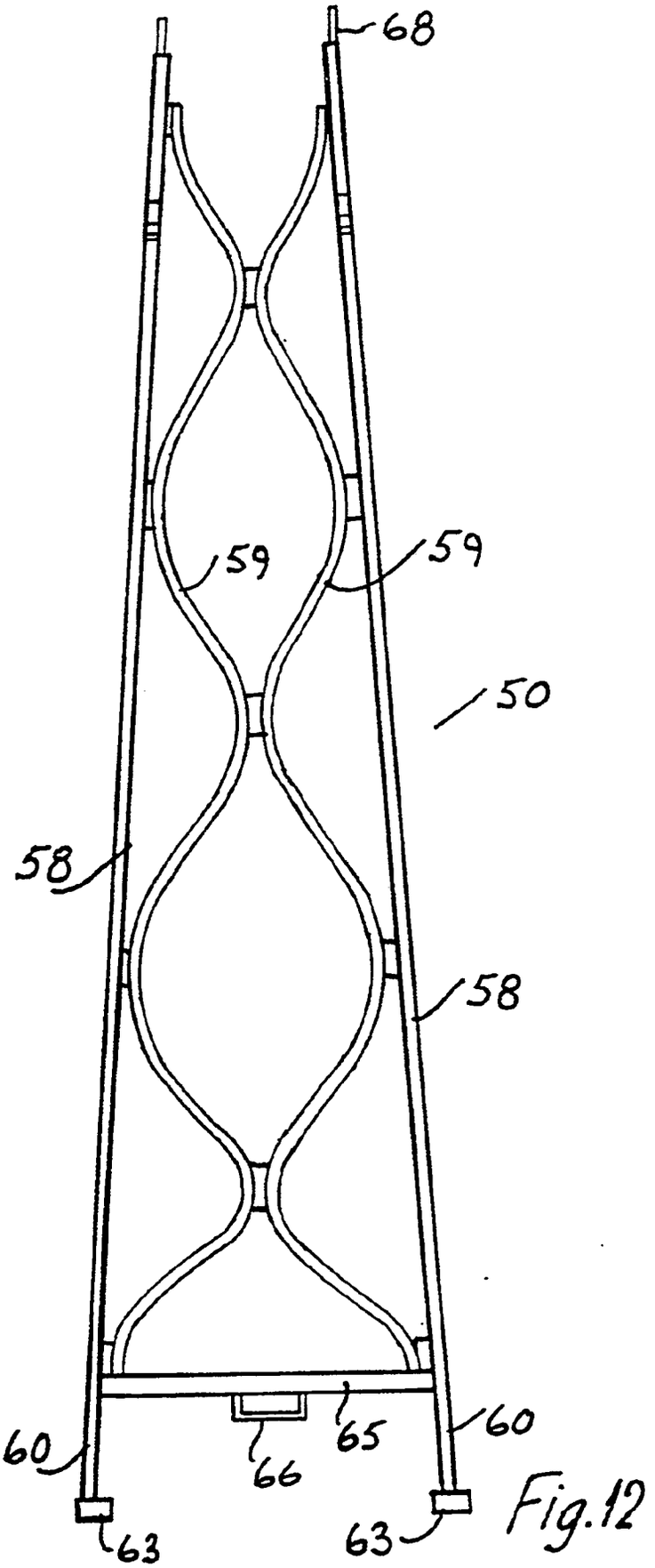

Fig.12

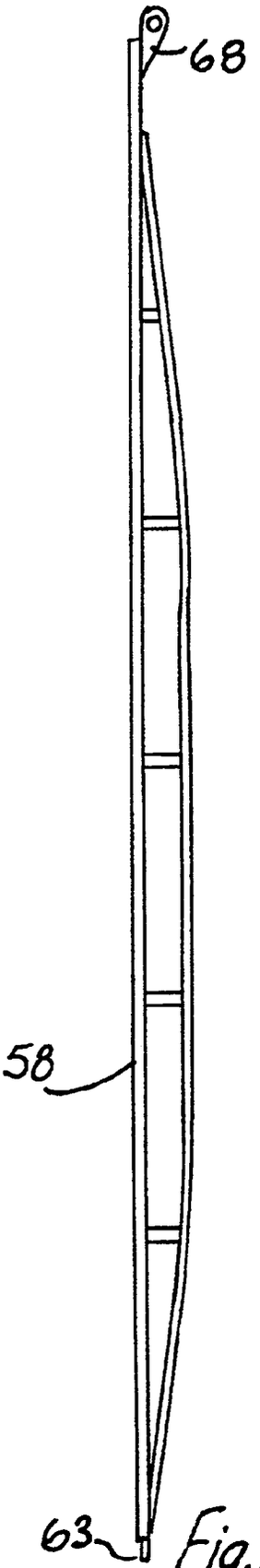

Fig.11

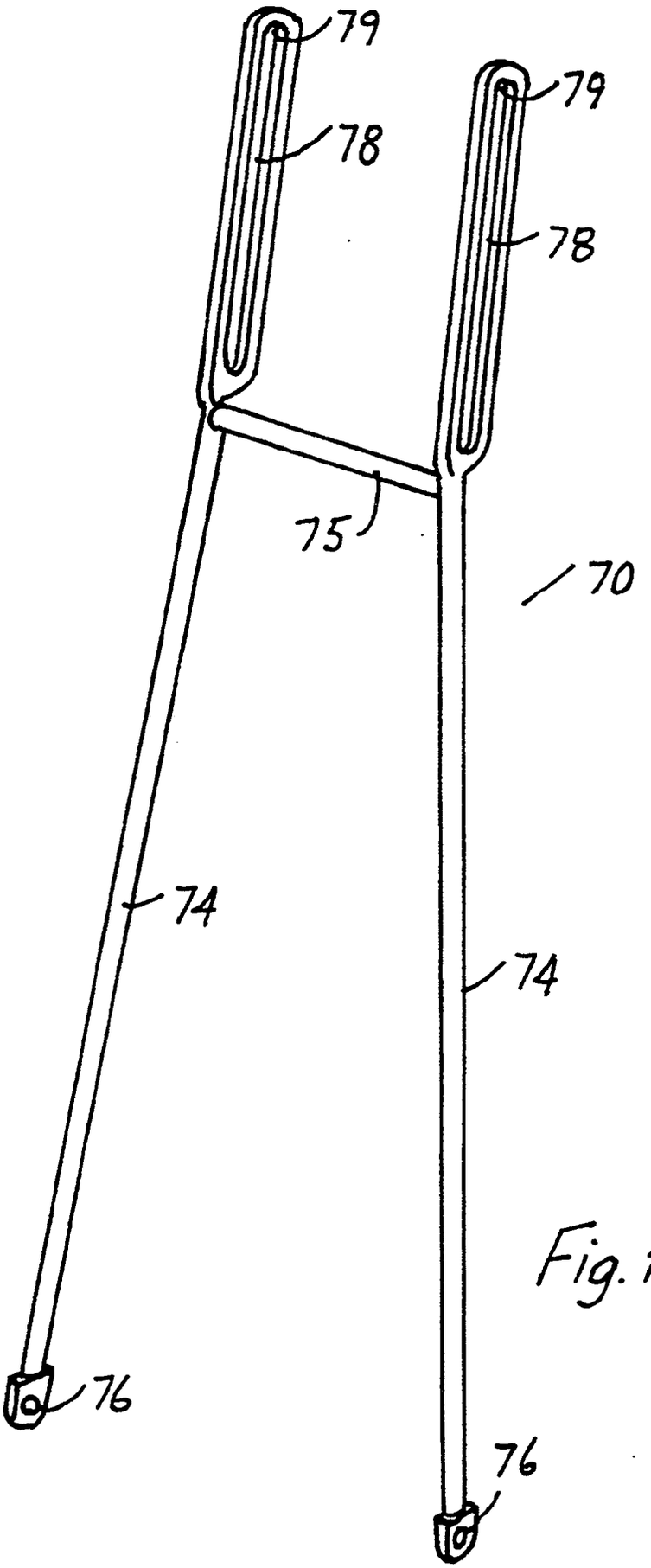

Fig. 13

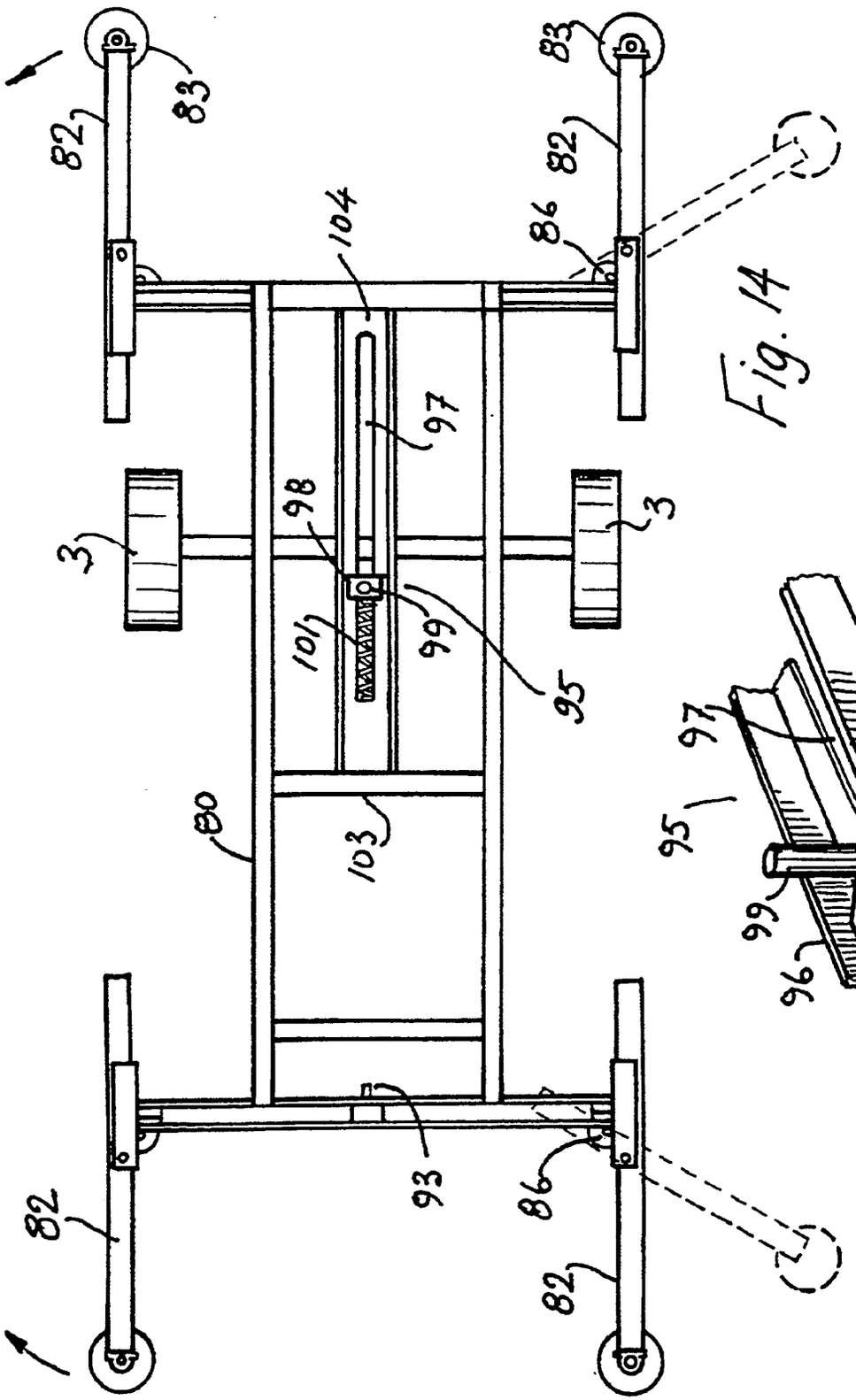

Fig. 14

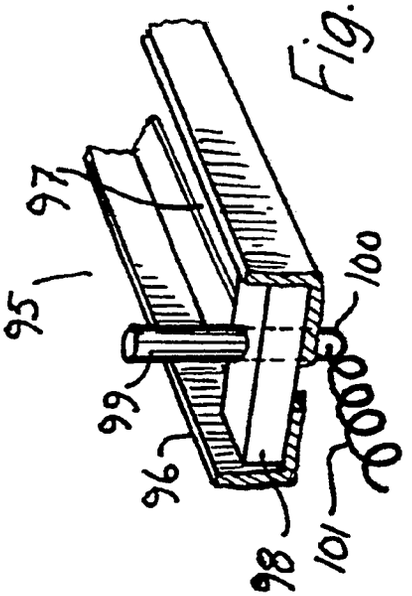

Fig. 17

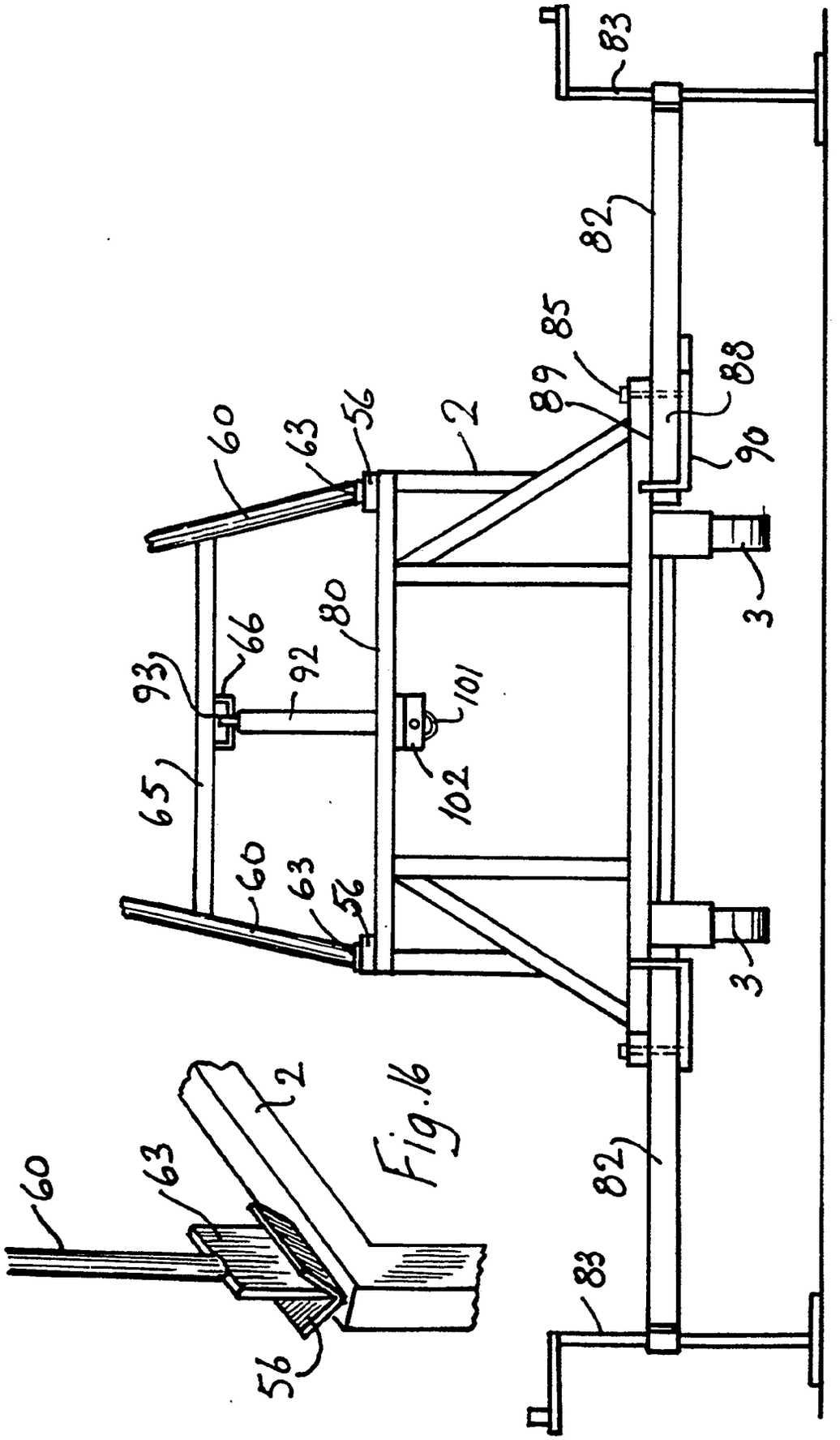

Fig. 15

Fig. 16

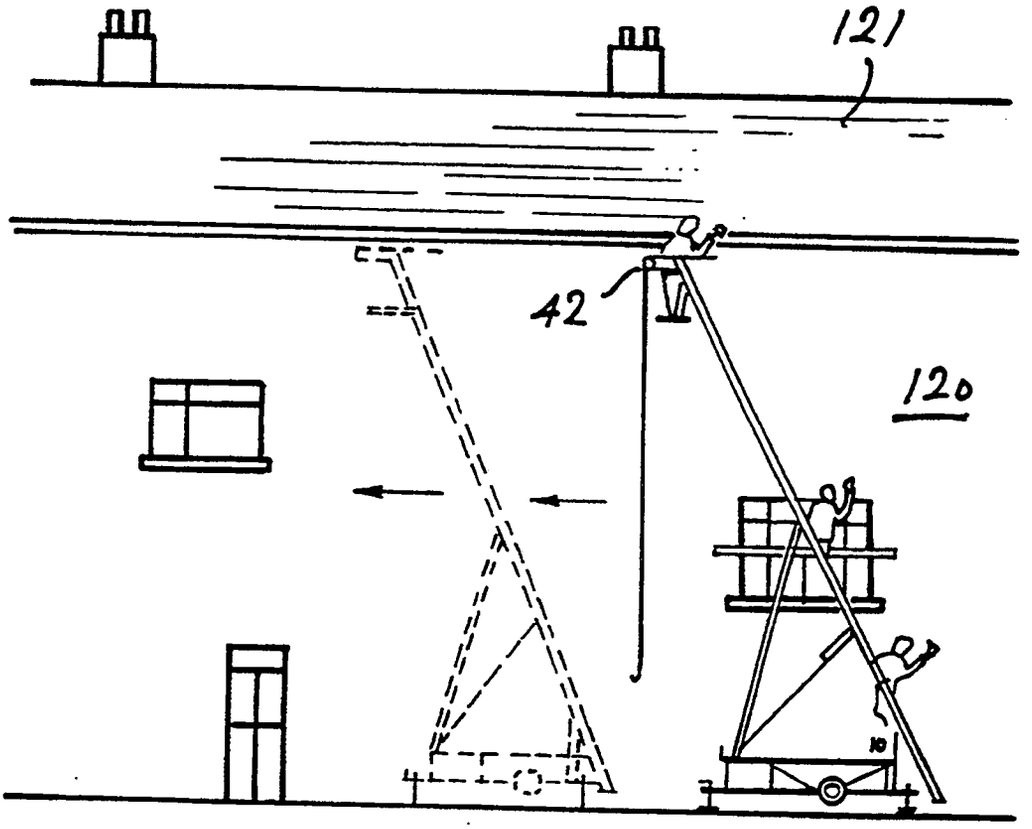

Fig. 18

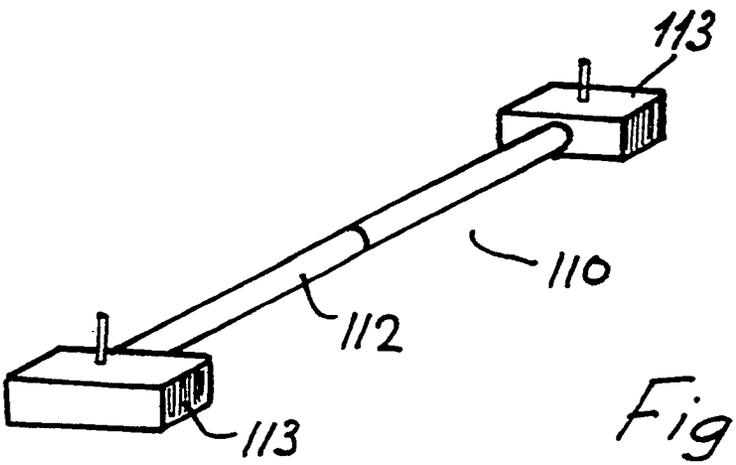

Fig. 19

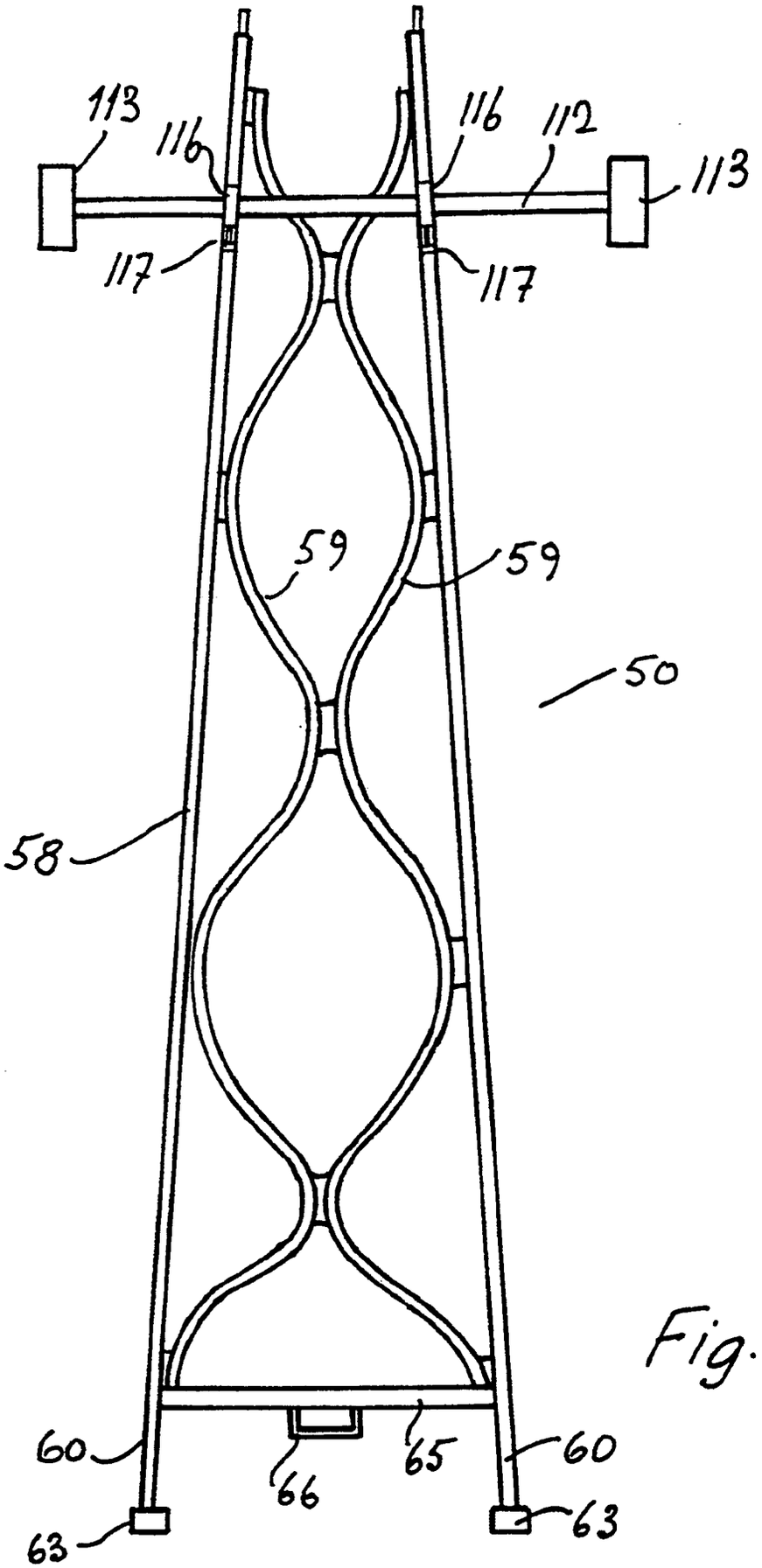

Fig.20

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 30 0285

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-4 202 428 (R.P. HICKMAN) * Column 3, line 66 - column 4, line 46; figures 2-7,22-24 *	1-3,11-13	E 06 C 05/04 E 06 C 01/38
Y		4-6,8	
A		7,9,10	
Y	US-A-4 094 381 (WILKERSON) * Column 3, lines 56-62; figures 1,3 *	4	
A		1	
Y	FR-A-2 473 614 (KINZIGER) * Page 5, line 14 - page 6, line 17; figures 1,2,5 *	5	
A		1,4,6,9,10	
Y	GB-A- 853 823 (O. WEINMANN) * Page 2, lines 82-102; figures 1,2 *	6	
A		1,7,10	
Y	US-A-1 798 070 (C.M. DEAN) * Page 1, line 85 - page 2, line 28; figures 1-4 *	8	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A		1	E 06 C
A	GB-A- 6 943 (H. BAYLEY)(A.D.1910) * Figures 1,2 *	1,7	
A	US-A-4 396 093 (ZIMMERMAN) * Column 3, line 57 - column 4, line 7; figures 1,2 *	4	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18-03-1991	RIGHETTI R.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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