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(54) **A safety device**

(57) The present invention relates to a safety device for a ladder to secure the ladder when the ladder is in

use. It comprises relocatable anchors and holders to improve the stability of the ladder and prevent it from falling to one side or away from the structure it is leaning against.

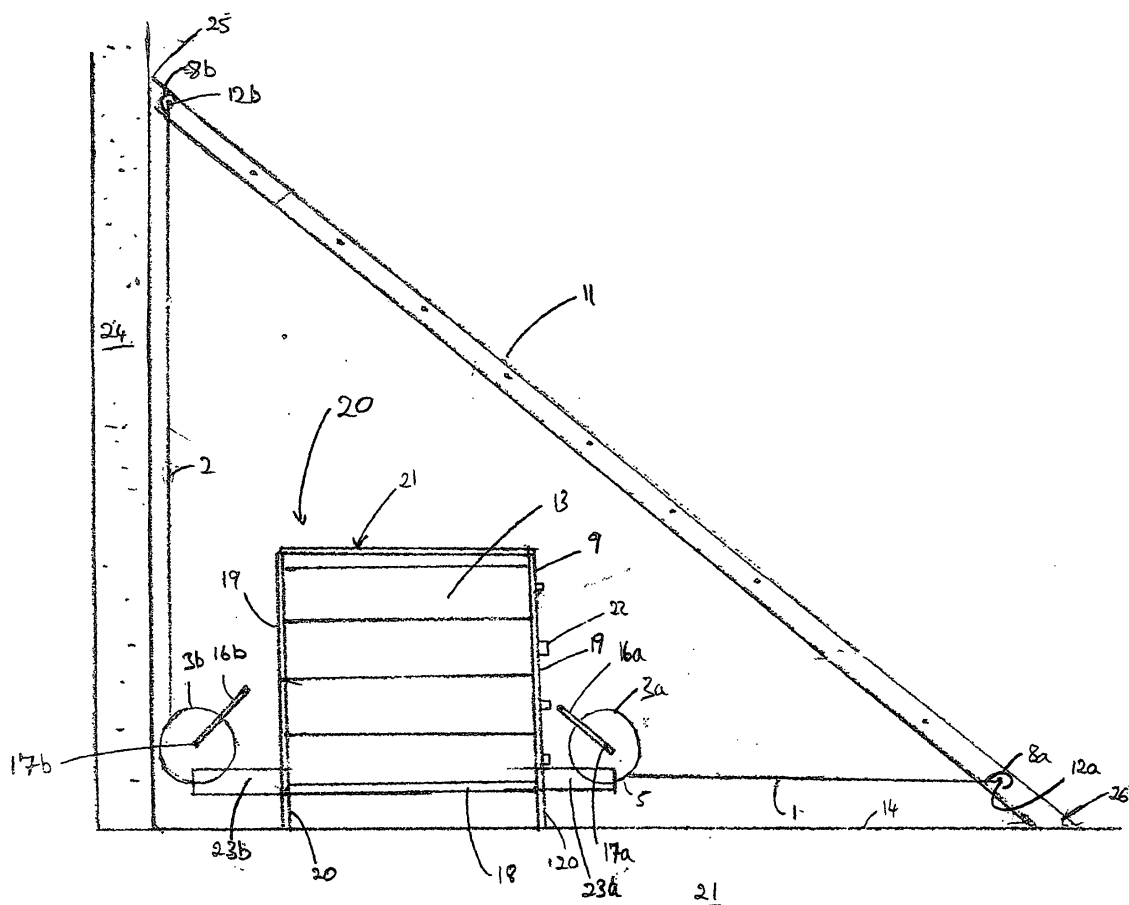


Fig. 1

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Description

[0001] The present invention relates to a safety device, in particular but not exclusively to a safety device for a ladder to secure the ladder when the ladder is in use.

[0002] Ladders are a common tool used to permit access to elevated points. During use ladders are leaned against a structure. For safety reasons a person is required to stabilise the ladder while a second person climbs the ladder. The second person usually holds the ladder to prevent it falling away from the structure. This doubles the man power required to complete a job in which a ladder is required. A second problem is that the second person may lack sufficient strength to stabilise the ladder adequately.

[0003] Safety devices have been developed to improve the safety of ladders so that the ladder is adequately secured while in use. However, these safety devices require the user to scale an unsecured ladder in order to secure them. For example, ties may be used to tie the ladder at its top rung to the structure against which the ladder leans. While the tie will prevent the ladder from falling backwards or to one side, the user must first scale the unsecured ladder in order to access the top rung of the ladder to secure the ladder to the structure using the ties. The ladder is in danger of falling as the user climbs the unsecured ladder. A further disadvantage is that in certain cases there is no suitable point on the structure to which the ties can be tied, in such cases it is not possible to secure the ladder.

[0004] According to a first aspect of the present invention there is provided a safety device for a ladder, the safety device comprising, one or more relocatable anchors, which, when the safety device is in use, is/are located proximate to a surface on which the ladder rests, and wherein the or each relocatable anchor comprises a holder capable of receiving one or more weight members; one or more connectors capable of connecting a relocatable anchor to the ladder such that the ladder is anchored in position.

[0005] The term "proximate to a surface" means within reaching distance of a person standing on the surface.

[0006] The ladder may be a rigid ladder or an extension ladder. As is well known in the art, rigid ladders and extension ladders usually operated by resting one end of the ladder on a surface, such as the surface of the ground, and leaning the opposite end of the ladder against another surface, such as a wall.

[0007] The safety device can be used to anchor the ladder so that the ladder is prevented from falling away from the surface against which the ladder leans, as the user climbs the ladder. The safety device eliminates the need for a second person to hold the ladder as it is being climbed. This has a number of advantages, including a reduction in the number of man-hours required to complete work. Also, unlike currently used means for securing ladders in which a second person holds the ladder

as it is being climbed, the level of security offered by the safety device is not reliant on the strength of the person holding the ladder and therefore provides increased security and safety for the person climbing the ladder.

[0008] Preferably the surface will be the surface of the ground.

[0009] The effective length of a connector may be adjustable. Preferably, the effective length of the or each of the connectors is adjustable. Preferably, the effective length of the connector may be adjusted to a length that is greater than or equal to the length of the ladder.

[0010] In providing a connector whose effective length is adjustable the user can secure the ladder without having to ascend the unsecured ladder in order to secure it. For example, while standing on the surface of the ground the user can connect the connector to what will become the highest rung of the ladder when the ladder is in its desired position. With the connector now connected to what will become the highest rung of the ladder, the effective length of the connector may be adjusted by the user such as to allow the user to raise the ladder, without restriction, to a desired position, while the user stands on the surface of the ground. Once the ladder has been raised to the desired position, the user may adjust the effective length of the connector while standing on the surface of the ground, so that a taut connection between the relocatable anchor and ladder is provided.

[0011] Additionally or alternatively, the ladder may comprise an intermediate connector. Preferably, the intermediate connector is pre-attached to what forms the highest rung of the ladder when the ladder is in its desired position. The intermediate connector may be engagable with the connector of the safety device. The intermediate connector may comprise an engaging means suitable for engaging with the connector of the safety device. The engagement means may be a hook, a self locking ring, a clip member or any other suitable means by which the intermediate connector may be connected to the connector of the safety device.

[0012] Preferably, when in use the relocatable anchor is positioned between the bottom end of the ladder and a surface of a structure against which the ladder leans. This will ensure that the relocatable anchor prevents the ladder from falling away from the structure. Preferably, the relocatable anchor is in alignment with the ladder such that it is directly beneath the ladder and is between an end of the ladder and the surface of the structure against which the ladder leans. The alignment of the ladder and the relocatable anchor will optimise safety.

[0013] The safety device may comprise a plurality of relocatable anchors, which, when the safety device is in use, are located proximate to a surface on which the ladder rests, and wherein at least one of the plurality of relocatable anchors comprises a holder capable of receiving one or more weight members. The safety device may further comprise a plurality of connectors capable of connecting the plurality of relocatable anchors to the ladder such that the ladder is anchored in position.

[0014] The safety device may comprise two relocatable anchors locatable so as to prevent the ladder from falling to one side. Preferably, the two relocatable anchors are locatable on opposite sides of the ladder, when the safety device is in use, so as to prevent the ladder from falling to one side or away from the wall.

[0015] The safety device may comprise three relocatable anchors, two of which are locatable to prevent the ladder from falling to one side and the third locatable such that it prevents the ladder from falling away from a structure against which the ladder leans. Preferably, the two relocatable anchors are located on opposite sides of the ladder as described above, and the third relocatable anchor is located in alignment with the ladder such that it is directly beneath the ladder and between an end of the ladder and a structure against which the ladder leans. Preferably, the third relocatable anchor is also located on the same vertical plane as the ladder. Preferably, the two relocatable anchors and the third relocatable anchor are each in alignment with one another.

[0016] The or each connector may comprise a cord. A cord also includes any strap or belt member. Preferably, the cord is substantially inelastic. The cord may comprise at least one of nylon, metal, steel, rope, wire, chain, cotton or any other suitable material.

[0017] The or each connector may further comprise an attachment element suitable for attaching the connector to the ladder. The attachment element may be a hook, a self locking link or ring, or manual locking link or ring, or the likes, or any other element suitable for attaching the connector to the ladder. Preferably, the attachment element is a hook that is suitable for hooking around a portion of the ladder. Preferably, the attachment element is a hook that is suitable for hooking around a rung of the ladder. The rung on the ladder may be adapted for engagement with the attachment element of the connector, for example, the rung may be dimensioned to enable the hook of the connector to be hooked around the rung, or the rung may define a recess, or comprise a hook, a self locking link, a manual locking link or a ring to facilitate connection of the connector to the ladder.

[0018] The safety device may further comprise one or more length adjustment means. A length adjustment means is any means which is operable to adjust the effective length of the connector. The one or more length adjustment means may comprise a winch. A connector may be wound around, or unwound from, a spool of the winch, so that the effective length of the connector is adjusted. Rotation of the winch in a first direction will cause the connector to be wound around the spool of the winch. Rotation of the winch in a second direction will cause the connector to be unwound from the spool of the winch. The or each winch may comprise a locking means which when activated will prevent rotation of the winch. The locking means may be an automatic locking means or manual locking means. The or each winch may be an electric winch.

[0019] The or each relocatable anchor may comprise

a weight member. Preferably, the or each relocatable anchor comprises a plurality of weight members. Optionally, some or each of the plurality of weight members have different weights. This allows the or each relocatable anchor to be transported piece-wise, thereby eliminating the need to lift a heavy weight when moving the or each relocatable anchor.

[0020] Preferably, the or each weight member comprises a handle portion. This will facilitate handling of the weights.

[0021] The or each weight member may comprise a frame. The frame may comprise steel or any other suitable material. Preferably the handle portion is fixed to the frame of the weight member.

[0022] The or each weight member may be of any suitable size, shape, aspect or design. For example, the weight members may be cylindrical, hemispherical, cube shaped or may have a shape such that it has a hexagonal, square or triangular cross-section. Preferably, the weight members are shaped complimentary to the holder to enable the holder to receive the weight members.

[0023] The or each weight member may comprise concrete and/or another low cost material, for example, the or each weight member may comprise cast iron.

[0024] The holder may be any suitable size, shape, aspect or design. For example, the holder may be cylindrical, hemispherical, cube shaped or may have a shape such that it has a hexagonal, square or triangular cross-section. The holder may be shaped complimentary to the one or more weight members, to enable the holder to receive the weight members.

[0025] The holder may further comprise a base member on which the one or more weight members rest. The holder may further comprise one or more leg members that raise the base member from a surface on which the holder is supported when the device is in use. The raised base member facilitates engagement of the holder with a transport means, such as a trolley.

[0026] The holder may further comprise one or more arm members which are capable of supporting length adjustment means, such as a winch. The one or more arm members may connect to the length adjustments means. Preferably, a length adjustments means is integral to the or each of the arm members. Preferably, the holder comprises first and second arm members. The first and second arm members may be located on opposite sides of the holder. Alternatively, the first or second arm members may be located on the same side of the holder.

[0027] An embodiment of the invention will now be described by way of example only, with reference to the accompanying drawings, in which are:

Figure 1 is a side view of a safety device according to a first embodiment of the invention in use;
Figure 2 is an arial view of a second embodiment of the invention in use;
Figure 3 is an arial view a third embodiment of the

invention in use;

Figure 4 is a perspective view of a weight member.

[0028] Figure 1 provides a side view of a ladder safety device 20 in use. The safety device 20 operates to secure a rigid ladder 11.

[0029] The safety device 20 is shown to comprise a relocatable anchor 21 which comprises a holder 9 which holds a plurality of weight members 13. A first connector, in the form of a first cord 1, and a second connector, in the form of a second cord 2 each connect the holder 9 to the ladder 11. First cord 1 comprises a hook 8a which is located at a free end of the first cord 1 and which is hooked around a rung 12a of ladder 11. The rung 12a forms the lowest rung of the ladder 11. Second cord 2 comprises a hook 8b which is located at a free end of second cord 2 and which is hooked around a rung 12b of the ladder 11. Rung 12b forms the highest rung of the ladder 11.

[0030] The holder 9 is supported on a surface 14 of the ground 21. The holder 9 comprises a base member 18 on which the plurality of weight members 13 rest. The base member 18 is supported above the surface 14 by means of legs 20. Side members 19 are provided to maintain the plurality of weight members 13 in vertical alignment. The holder 9 further comprises arm members 23a, 23b. The arm members 23a, 23b are arranged on opposing sides of the holder 9.

[0031] Each of the plurality of weight members 13 is designed to fit snugly between the side members 19 of the holder 9. As shown in the drawing, the weight members 13 are stacked in vertical alignment within the holder 9. Each of the plurality of weight members 13 is provided with a handle 22 to facilitate handling.

[0032] As is shown in the drawing, a first length adjusting means in the form of a first winch 3a and a second length adjustment means in the form of a second winch 3b, is attached to arm members 23a and 23b respectively. The effective length of the first cord 1 may be adjusted by operating the first winch 3a, while the effective length of the second cord 2 may be adjusted by operating the second winch 3b.

[0033] Each winch 3a, 3b comprises a spool (not shown) around which each of the first and second cords 1, 2 may be wound respectively. Each winch 3a, 3b further comprises a hand crank 16a, 16b which is rotatable about axle 17a, 17b in either a clockwise or anticlockwise direction. Rotating the hand crank 16a in a clockwise direction causes the first cord 1 to be wound onto the spool of the first winch 3a. Rotating the hand crank 16b in a clockwise direction causes the second cord 2 to be wound onto the spool of the second winch 3b. Rotating the hand crank 16a in an anti-clockwise direction unwinds first cord 1 from the spool of the first winch 3a. Rotating the hand crank 16b in an anticlockwise direction unwinds second cord 2 from the spool of the second winch 3b.

[0034] To arrive at the arrangement illustrated in Figure 1, the user first positions the holder 9 at a point prox-

imate a structure 24 which the user desires to scale. For optimum results the holder 9 should be located such that it will be directly beneath the ladder 11 when the ladder 11 has been leant against the structure 24 in its desired position.

[0035] Once in position, the user stacks one or more weight members 13, preferably one by one, into the holder 9. The side members 19 of the holder member 9 will ensure that the weight members 13 are vertically aligned when stacked within the holder 9.

[0036] The user subsequently rotates the hand crank 16b of the second winch 3b in an anticlockwise direction so as to unwind the second cord 2 from the spool of the second winch 3b. Preferably, the length of second cord 2 unwound from the spool of second winch 3b should be at least be equal to the height above the surface 14 at which the highest rung 12b of the ladder 11 will be located when the ladder 11 is placed into a desired position. Once the required length of second cord 2 has been unwound from the spool of the second winch 3b, the user, while standing on the surface 14, hooks the hook 8b of the second cord 2 around what will form the highest rung 12b and the ladder 11 when the ladder 11 is in its desired position.

[0037] Once the hook 8b has been hooked around what will form the highest rung 12b of the ladder, the user, while standing on the surface 14 of the ground 21, then raises the ladder 11 to the desired position, such that the ladder 11 rests on the ground 21 surface 14 and leans against the structure 24.

[0038] Once the ladder 11 has been arranged into its desired position, the user subsequently rotates the hand crank 16a of the first winch 3a in an anticlockwise direction so as to unwind the first cord 1 from the spool of the first winch 3a. The length of first cord 1 unwound from the spool of the first winch 3a, should be sufficient to enable the hook 8a of the first cord 1 to be hooked around the lowest rung 12a of ladder 11. Once the required length of first cord 1 has been unwound from the first winch 3a, the user, while standing on surface 14, hooks the hook 8a of the first cord 1 around the lowest rung of 12a of the ladder 11.

[0039] With the ladder 11 in position and the hooks 8a, 8b of both the first and second cords 1, 2 hooked around the lowest rung 12a and the highest rung 12b respectively, the user, while standing on the surface 14, then operates the winches 3a, 3b to gather any slack in the first and second cords 1, 2. For optimum results the user will firstly gather the slack in the second cord 2 and subsequently gather the slack in the first cord 1.

[0040] The safety device 20 will anchor the ladder 11 so that a top end 25 of the ladder 11 will not fall in a direction away from the structure 24 as the user climbs the ladder 11. Furthermore, safety device 20 will prevent a bottom end 26 of the ladder 11 from sliding along the surface 14 in a direction away from the structure 24. With ladder 11 secured the user may proceed to climb the ladder 11 with a reduced risk of accident. Additionally,

the need for a second person to secure the ladder 11 by holding it proximate to the bottom end 26 is eliminated. This reduces the likelihood of accident due to human error and also reduces the man-power required to complete work.

[0041] Figure 2 provides a plan view of a second embodiment of the invention. In the second safety device 120 illustrated in Figure 2, a first relocatable anchor 90a and a second relocatable anchor 90b are provided. Each relocatable anchor 90a, 90b is positioned substantially symmetrical with respect to the ladder 11. The first relocatable anchor 90a has a first holder 80a, and the second relocatable anchor 90b has a second holder 80b. Two arm members 43a, 43b of the first holder 80a are arranged on the same side 100a of the first holder 80a, and two arm members 53a, 53b of the second holder 80b are arranged on the same side 100b of the second holder 90b. Arm members 43a and 53a are orientated at a substantially 45 degree angle with respect to the vertical plane of side 100a and side 100b respectively.

[0042] The second safety device 120 anchors the ladder 11 in the same manner as described above in relation to the safety device 20 shown in figure 1, so that a top end 25 of the ladder 11 will not fall in a direction away from the structure 24, the safety device 120 will also prevent a bottom end 26 of the ladder 11 from sliding along the surface 14 in a direction away from the structure 24. Additionally, as the safety device 120 anchors the ladder 11 from either side, the ladder 11 is also prevented from falling to either side.

[0043] In a third embodiment of the invention the first safety device 20 of the first embodiment and the second safety device 120 of the second embodiment are combined. Figure 3 provides an arial view of the third embodiment of the invention.

[0044] Figure 4 provides a perspective view typical weight member 13 that may be used with any of the embodiments shown in Figure 1, 2 or 3. The weight member 13 comprises a substantially square frame 50 defining a central aperture 51. The frame 50 is made of steel, however it will be understood that the frame 50 could be made from any other suitable material. A concrete filling 52 is arranged to fill the aperture 51 so as to increase the weight of the weight member 13. The frame 50 is further provided with a handle 22 which is secured to the frame by means of a fastener 56.

[0045] While the weight member 13 shown in Figure 4 comprises a concrete filling 52 to increase the weight of the weight member 13, it should be understood that the filling 52 could be formed of any suitable material such as rubber, metal or wood. Furthermore, while a square frame 50 is illustrate in figure 4 the skilled person would understand that any suitably shaped frame 50 may be used, for example the frame 50 may or may have circular, hexagonal, square or rectangular shaped perimeter. Various modifications and variations to the described embodiments of the invention will be apparent to those skilled in the art without departing from the scope

of the invention as defined in the appended claims. Although the invention has been described in connection with specific preferred embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiment.

Claims

1. A safety device for a ladder comprising; one or more relocatable anchors, which when the safety device is in use, is/are located proximate to a surface on which the ladder rests and wherein the or each relocatable anchor comprises a holder capable of receiving one or more weight members, each weight member comprising a frame portion, a handle portion and arm members capable of supporting length adjusting means; one or more connectors capable of connecting a relocatable anchor to the ladder such that the ladder is anchored in position.
2. A safety device as claimed in claim 1 wherein each connector may comprise of a cord, this cord being preferably a strap or belt member, being substantially inelastic and preferably comprising at least one of nylon, metal, steel, rope, wire, chain, cotton, or any other suitable material.
3. A safety device as claimed in claim 2 comprising one or more length adjustment means, preferably a winch, for adjusting the length of the connector.
4. A safety device as claimed any of claims 1 to 3 wherein the ladder may comprise an intermediate connector; preferably the intermediate connector is pre-attached to what forms the highest rung of the ladder when the ladder is at its desired position; preferably the intermediate connector may be engagable with the connector of the safety device; the intermediate connector comprising an engaging means suitable for engaging with the connector of the safety device, this engagement means being a hook, a self locking clip, a clip device or any suitable means.
5. A safety device as claimed in any preceding claim wherein, in use, the relocatable anchor is positioned between the end of the ladder and a surface of a structure against which the ladder leans; preferably the anchor is in alignment with the ladder such that it is directly beneath the ladder and is between the end of the ladder and the surface of the structure against which the ladder leans.
6. A safety device as claimed in any preceding claim wherein the relocatable anchors are locatable so as to prevent the ladder from falling to one side; preferably two anchors are locatable on the opposite

sides of the ladder so as to prevent the ladder falling to one side; preferably three anchors are locatable to prevent the ladder falling away from the wall; preferably the two relocatable anchors and the third relocatable anchors are in alignment with each other. 5

7. A safety device as claimed in claim 7 further comprising an attachment element for attaching the connector to the ladder, the attachment element preferably being a hook, or self locking link or ring, suitable for hooking around a portion of the ladder or rung of the ladder; the rung being adapted for engagement of the hook. 10

8. A safety device as disclosed herein with reference to the accompanying drawings. 15

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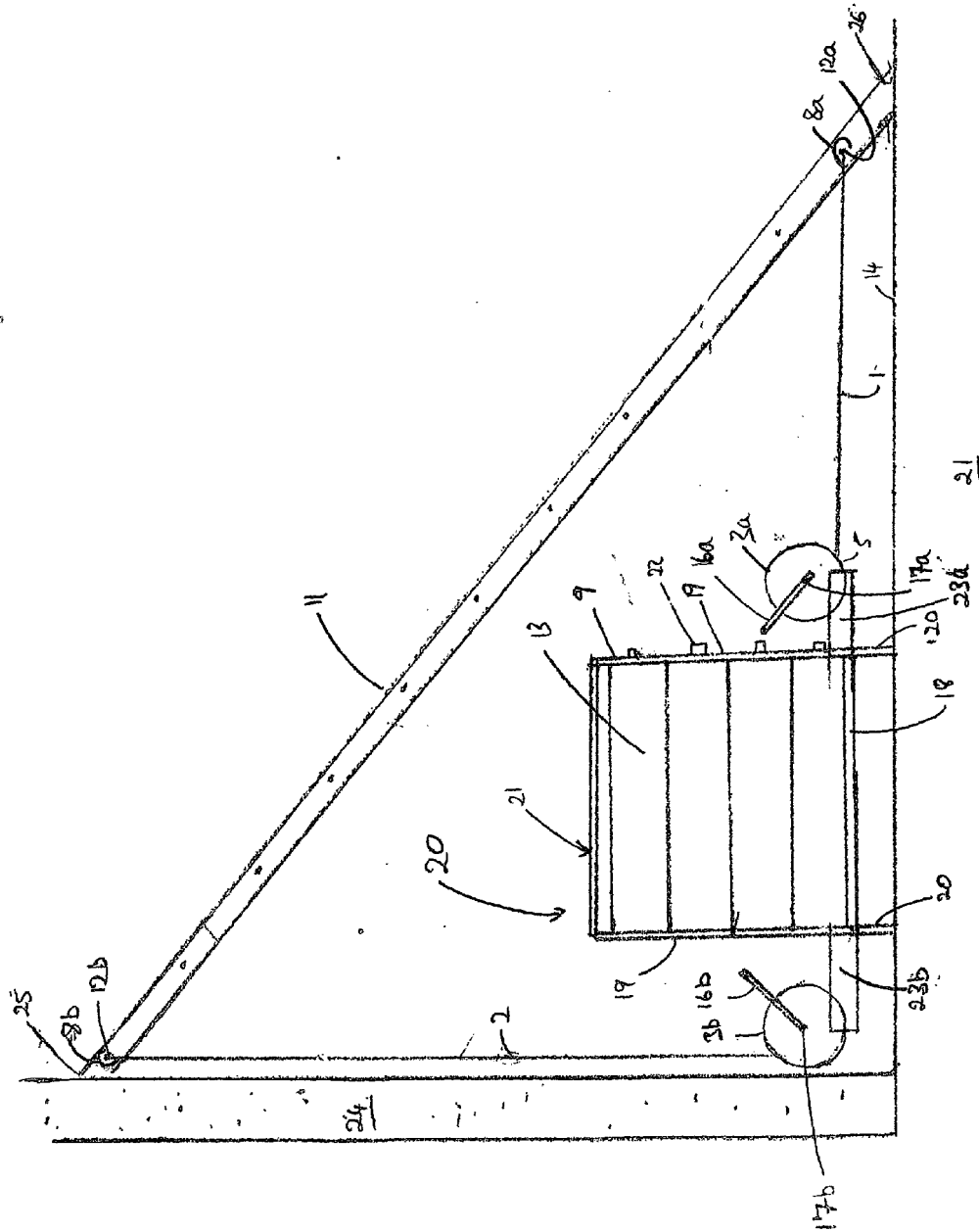


Fig. 1

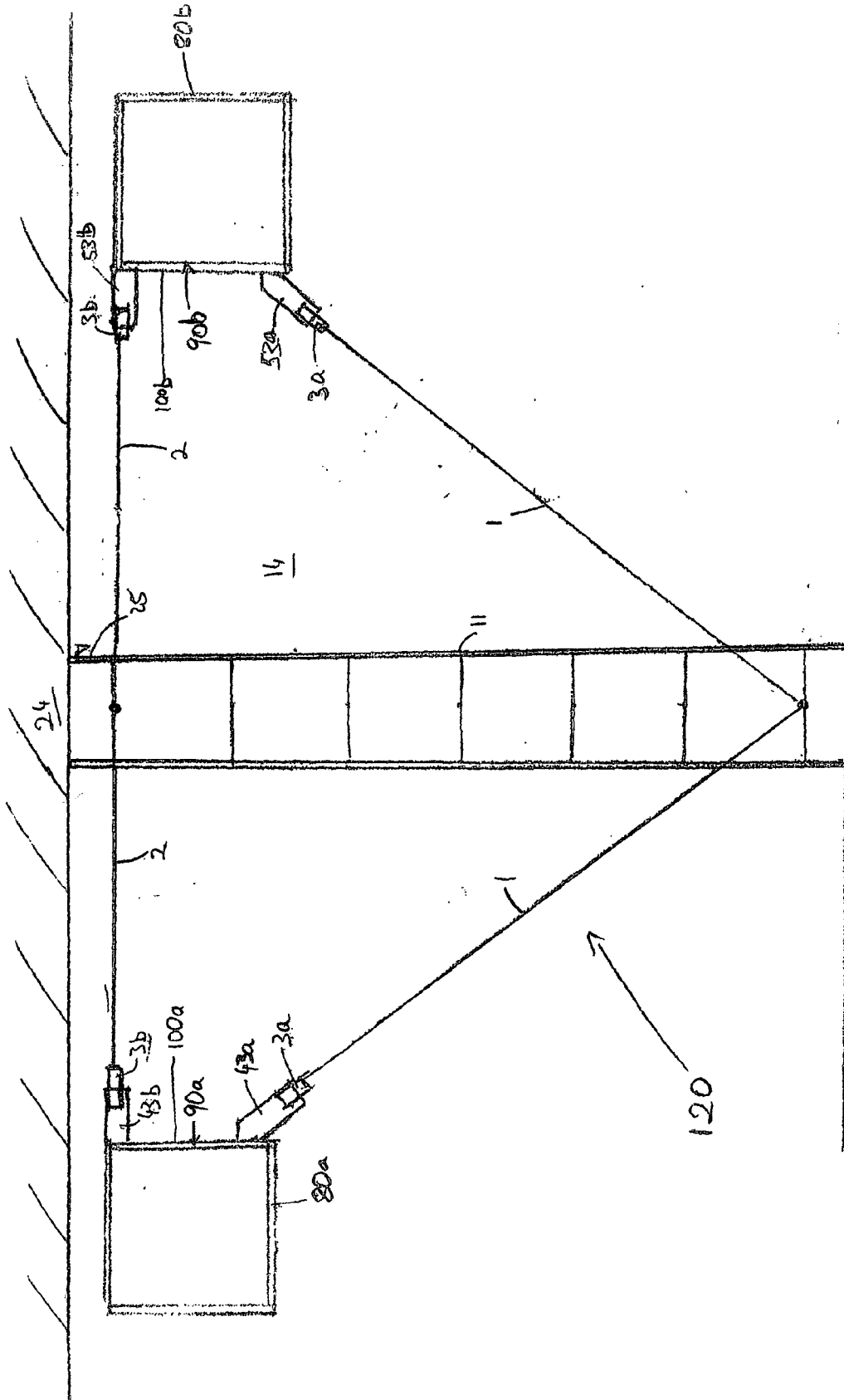
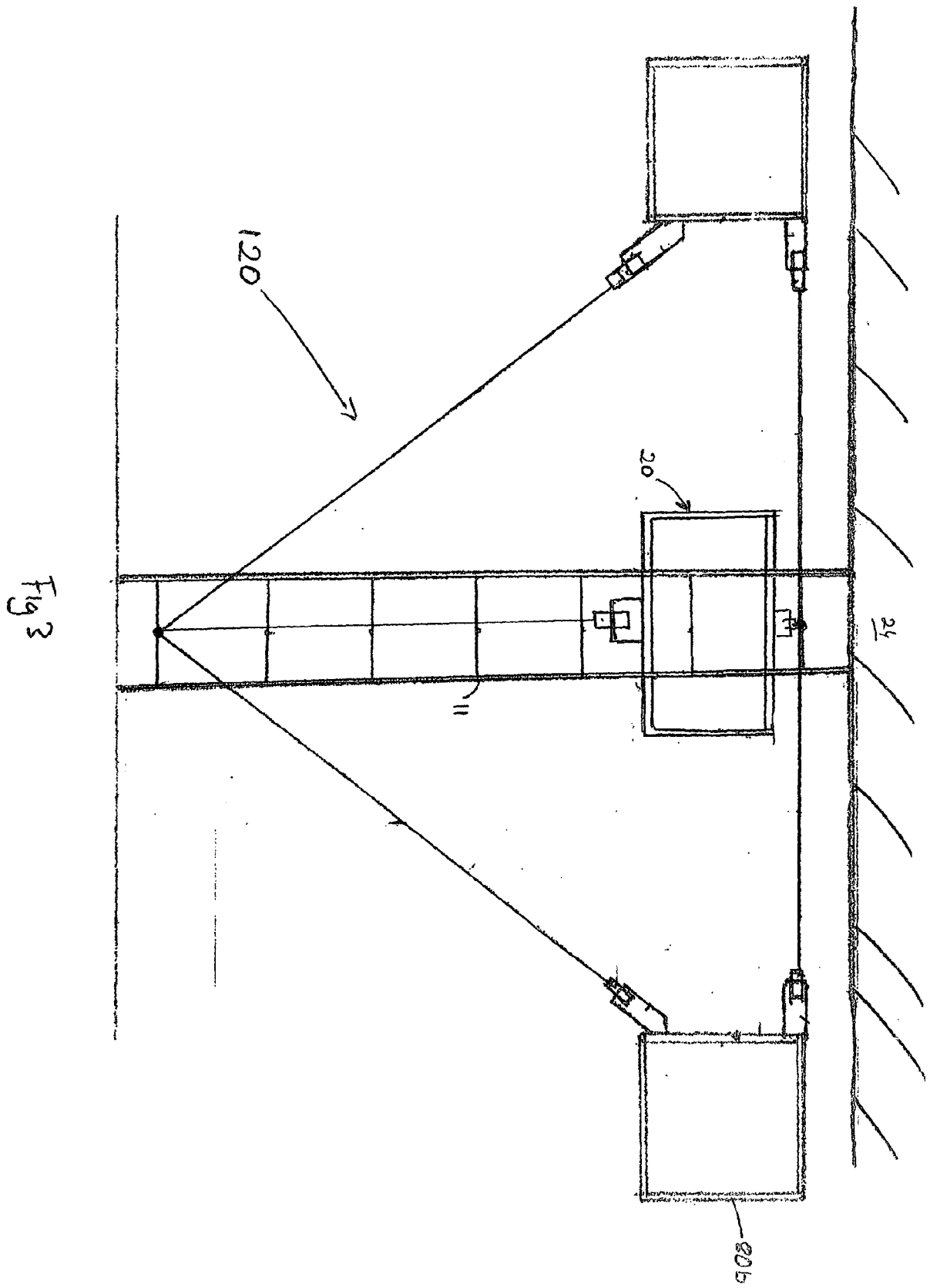


Fig. 2.



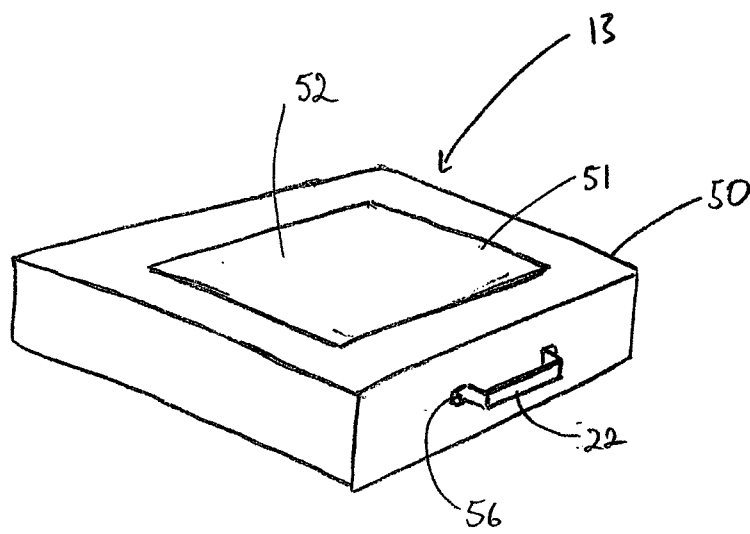


Fig. 4