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A stabilisation assembly for a ladder and a stable ladder

Statement of Technical Field

The present invention relates to a stabilisation assembly for use in stabilising a ladder and a stable ladder comprising the stabilisation assembly. Specifically, the invention relates to a foldable assembly to provide support to at least one side of a ladder.

Background

Conventional ladders have a pair of elongate side pieces called 'stiles', joined at intervals by crosspieces which are usually called 'rungs', on to which a user can step (as illustrated in Figure 1A). The side pieces (stiles) are usually an 'H' in cross-section, having inner and outer faces (as illustrated in Figure 1B). This shape is ideal for attaching additional components to a ladder and is used to reduce weight, as well as preventing the ladder from flexing too much, especially those made from lightweight metal, such as aluminium, which are the most common type now available. Ladders made of wood often have side pieces (stiles) with an oval cross-section as they are sufficiently rigid not to need the additional shaping; however, such wooden ladders are often very heavy.

A problem with ladder in use is that although usually quite straightforward, people tend to try and overreach when they are high up them, effectively reaching too far out, which can lead to the ladder falling over, which can result in serious injury, or even death.

Traditionally, people have tried to stabilise ladders by having a second person standing on one of the bottom rungs, or adding a sack or bag of sand to the same place.

Several ladder stabilisation solutions have been devised which improve on the above methods to increase the stability of the ladder in use. One concept is to add some gripping material to the ends of the stiles that provides friction against the ground to reduce the risk of the ladder slipping. These are simply called 'feet', and the ladder shown in Figure 1A includes such feet. The feet are often rubber, and many include a 'tread' pattern, like that of a bicycle or car tyre. The problem with generic feet is, if they are supplied separately, they may not fit the end of a ladder's stiles very well, so they might not add the necessary stability.

A second known idea, exemplified in Figure 2, is a ladder in which the lowermost rung extends beyond the stiles on both sides. If this extended rung is sufficiently close to the surface the ladder is resting on, it adds lateral stability and reduces the possibility of a user tipping sideways if they overreach. These extended rungs can also have feet which further helps to reduce slippage. A problem with such ladders is that they are difficult to store because the elongate rung makes the ladder bulky. Also, because the extended rung is fixed in position it is difficult to use the ladder in small spaces, such as stairways, or on uneven ground.

A third variant that has also been promoted and sold in recent years is shown in Figure 3. An arm is bolted on to the bottom of a stile using a clamped cuff around one or each side of the 'H' section on the inner and outer face. The free end of the arm may include a foot to help the arm firmly engage the ground. These arms come in variants that include the arm being fixed to the cuff or the arm being pivotable around a joint where the arm is attached to the cuff, with the weight of the ladder stopping the arm from pivoting when in use. These arms are added by sliding the cuff over the bottom end of the stile once a ladder has been put up. The arms can be placed at different heights on either side of the ladder, making them work on uneven ground and, being separate items, they also do away with the bulk problem of the extended rung shown in Figure 2. However, they can get lost and it has been found that many users simply don't bother to add them as it takes time to attach them correctly to the ladder.

Therefore, the present invention aims to solve the above problems of the prior art devices.

Statement of Invention

In a first aspect of the present invention there is provided a stabilisation assembly for a ladder, comprising; an elongate support piece, a support arm pivotably connected to the lower end of the support piece via a releasable securing means, such that it can be movable between a first closed arrangement and a second open arrangement, and secured in either arrangement; wherein in the second open arrangement the support arm provides sufficient contact with the ground in use, an adjustable length connection piece connected to the

support piece at a first end via a first connection means and the support arm at a second end via a second connection means, wherein at least one of the first or second connection means is a slidable connection means to facilitate the movement between the first and second arrangements; and comprises a releasable securing means to secure the device in the first and/or second arrangement; and wherein the connection piece is adjustable in length such that the length can vary between the first and second arrangements.

This assembly advantageously can be retrofitted to either side of a ladder, or both sides of a ladder to provide stability in use resulting in a safer ladder in use. The elongate support piece is suitable for attachment to a ladder the user already owns saving the user costs and reducing waste.

The adaptability of the assembly from a first closed and second open arrangement, has many advantages. Including that the closed arrangement allows the assembly to be easily stored and transported as the support arm and assembly as a whole is folded up towards the ladder. In addition the pivotability of the securing arm to the securing piece advantageously means the support arm can be folded out to different angles to ensure good contact with the ground. This allows it to be used on an angled surface. Further the assemblies on either side of the ladder can be adjusted to different angles independently allowing the ladder to be used on a wider range of surfaces.

In addition, the ability of the connection means to vary in length advantageously allows the separation between a fixed point on the support piece and a fixed point on the support arm to change as the support piece and support arm pivot relative to one another. Although the slidable connection means allows suitability for with minor changes in angle between the pivotally connected support piece and support arm, the connecting piece needs to vary in length to fully accommodate the transition between a first and second arrangement of the assembly.

Preferably, the slidable connection means may be indirectly attached to the support piece or support arm via a T-bar. The T-bar can be any shape, provided it allows the slidable connection means to slide up and down it. T-bars are known, convenient and strong. Thus providing a strong connection to the support piece.

In an embodiment the other of the first or second connection means, which is not the slidable connection, may be a pivotable connection. This improves the ability of the assembly to be moved between its first and second arrangements.

In an embodiment the elongate support piece may be suitable for fixing to a stile of a ladder in use. Fixation may be by any suitable means and may be permanent or reversible. Fixation may be in the H-section of a stile or clamped around the shape of a wooden stile. This advantageously allows the assembly to

be connected to an existing ladder and then folded between the first and second positions resulting in the assembly being easily usable and therefor increasing user engagement.

Preferably, the slidable connection means may be a first sleeve. This allows an easily slidable connection which is difficult to become separated.

In an embodiment the slidable connection means may have a hole through it, optionally with an internal screw thread that allows a bolt to be inserted to provide the releasable securing means. This advantageously allows the slidable connection means to be securely tightened in the closed and/ or open positions but released during transition between the arrangements. This also advantageously allows the height and/or angle of the assembly to be adjusted according to the surface on which it is used.

Preferably, the hole may be located on the top or side face of the slidable connection means. This allows multiple variations to be provided that allow the user easy access to the releasable securing means in use.

Preferably, the adjustable length connection piece may comprise two strut elements which can slide relative to each other and may have a releasable securing means. This results in thee easy adjustment of the length of the connection means to facilitate different distance between the support piece and

support arm in use. This allows the assembly to be used on a range of different surfaces, including angled surfaces.

In a first embodiment the two strut elements may be arranged adjacent to each other and may be held together using a second sleeve comprising a releasable securing means. This allows the easy adjustment of the distance and then the releasable securing of the desired distance in use. Preferably, each of the two struts may have a curved free end, this stops the struts fully sliding out of the releasable securing means.

In an alternative embodiment the two strut elements may be arranged such that one of the two strut elements fits inside the other and may be pulled out telescopically, and may be held together using a releasable securing means. This provides an alternative arrangement which offers a tidier looking assembly.

The support arm may be any shape and may be formed from one or multiple pieces.

In an embodiment the support arm may have a rubber coating for extra grip on the surface in contact with the ground in use. This increases the friction on the ground and further stabilises the assembly in use.

In an alternative embodiment the support arm may have a foam coating for improved contact with the ground in use. This allows the assembly to be in contact with all or as much of the ground as possible, even if it is used on uneven terrain. Thus this improves the versatility of the assembly.

In an embodiment the support arm may further comprise a releasably secured inner arm for extension of the length of the support arm. This allows the support arm to be extended a long way, increasing the stability provided by the assembly.

In an embodiment the inner arm may extend telescopically. This advantageously allows more efficient storage and transport of the device as the inner arms to not require additional room as they are stored in the support arm.

In an alternative embodiment the inner arm may be attached to the support arm via a pivotable connection. This allows an alternative arrangement to be selected based on user requirements.

In an embodiment the support arm may further comprise at least one support spike. Support spikes can provide further stability in certain instances, such as when the ground is soft. A plurality of support spikes may be included.

In an embodiment the support arm may further comprise a visual indicator on the far end. The visual indicator may be a reflective triangle of known type, This advantageously shows there is something extending from the ladder on the ground to avoid people walking past tripping over it.

In an embodiment the inner arm may further comprise a support spike and/or visual indicator. This allows the inner arm to have the same advantages as outlined above.

In an embodiment the support spike may be pivotably connected. This allows the support spikes to be folded away when the assembly is in the closed position and moved to a usable position in the open position. The support spikes can be held in place with a nut and bolt, or with a rivet, and the user can simply pull one or more of the spikes into place when the ladder stabiliser assembly has been placed in the open position.

In an embodiment the visual indicator may be an illuminated or reflective triangle. The illumination may be a light. This improves the visibility of the visual indicator.

Preferably, the releasable securing means may be wingnut and bolts. Alternatively the releasable securing means may be butterfly nuts. Both options advantageously have two large wings either side of a threaded ring so that a user could simply use their fingers to tighten the numerous bolts

A second aspect of the invention provides a ladder comprising two stiles and at least one assembly according to any of claims 1-22, wherein the elongate support piece is the stile of the ladder. This advantageously provides a ladder with the assembly device integral. This ensures the assembly is securely attached to the ladder.

Preferably, two assemblies according to any of claims 1-22 may be included, wherein one assembly may be on each stile of the ladder. This allows the ladder to be secured on both sides, which is preferable. However, this arrangement advantageously allows the ladder to be used with the assembly means in small spaces as an assembly on only one side can be used. Additionally, it allows the ladder to be used on uneven ground as the assemblies can be adjusted to different angles accordingly.

A third aspect of the invention provides a kit, comprising the assembly of any of claims 1-22 and a ladder. This provides an easy to assemble stabilised ladder.

The embodiments and advantages described in relation to one aspect apply equally to all aspects of the invention.

Description of Figures

The invention will be described in more detail with reference to the following figures, in which:

Figure 1A illustrates a front view of a ladder of the prior art.

Figure 1B illustrates a top view of a ladder of the prior art.

Figure 2 illustrates a front view of a stabilised ladder of the prior art.

Figure 3 illustrates a perspective view of a stabilisation device of the prior art.

Figure 4A illustrates a front view of an embodiment of an assembly of the present invention in a closed arrangement.

Figure 4B illustrates a front view of an embodiment of an assembly of the present invention in an open arrangement.

Like reference numerals represent like features.

Specific Description

Regarding Figure 4A, it is shown a first embodiment of a stabilising assembly of the present invention in the closed arrangement. A ladder 1 comprising a stile 3 and four rungs 2. to which the assembly would be attached, is shown in dashed lines. The assembly has an elongate support piece 20 which is fixed to the stile 3 of the ladder 1. At the lower end of the support piece 20, there is provided a releasable securing means in the form of a wingnut and bolt 21 that connects the support piece 20 to a support arm 22 that, in use, contacts the ground. Once the support arm 22 has been folded out from the support piece 20, the wingnut 21 can be tightened. The support arm 22 has a rubber coating 23 for extra grip on

its lower face. It could instead have a foam coating, which, although not providing much grip in itself, can better match the contours of the ground. A connecting piece is provided between the support piece 20 and support arm 22. The connection piece is slidably attached to a T-bar 24 attached to the support piece 20. The slidable attachment means is a first sleeve 25 which can slide up and down. The first sleeve 25 has a hole through it with an internal screw thread that allows a bolt 26 to be inserted which can be tightened against the T-bar 24 to secure the first sleeve 25 in place on the T-bar 24. It doesn't matter if the hole is located on the top or side face of the first sleeve 25 provided that, when the bolt is tightened, the first sleeve 25 is forced against a surface of the T-bar 24 to stop the first sleeve 25 moving. The connecting piece extends from the first sleeve 25 to a point on the support arm 22. Sliding the first sleeve 25 towards the top of the T-bar 24 causes the whole assembly to be pulled 'up' against the ladder 1 into the first 'closed' arrangement. If the bolt 26 of the first sleeve is tightened, it will remain secured in this closed arrangement, helping to keep it out of the way when transporting the ladder and ensuring my stabiliser does not get lost. The adjustable length connecting means comprises two struts 27 28, the first strut 27 element also has a flared or curved free end 30, which means it cannot be pulled out of the second sleeve 29 accidentally. The second strut element 28 sits adjacent the first strut element 27 within the second sleeve 29 and has a similar flared end 31. There is a bolt 32 in the second sleeve 29 which passes through a threaded hole. When the bolt is loose, the two strut elements 27 28 can slide relative to each other, which means the total length of the connecting piece can be varied. Once the user has opened the stabiliser assembly to the position they

wish, they tighten the bolt 32 in the second sleeve to lock the two strut elements together, which, along with tightening the other bolts, provides a very strong support.

Regarding Figure 4B, it is shown a first embodiment of a stabilising assembly of the present invention in the open arrangement. The assembly has an elongate support piece 20, which can be fixed to a ladder (not shown). At the lower end of the support piece 20, there is provided a releasable securing means in the form of a wingnut and bolt 21 that connects the support piece 20 to a support arm 22 that, in use, contacts the ground. Once the support arm 22 has been folded out from the support piece 20, the wingnut 21 can be tightened. The support arm 22 has a rubber coating 23 for extra grip on its lower face. It could instead have a foam coating, which, although not providing much grip in itself, can better match the contours of the ground. A connecting piece is provided between the support piece 20 and support arm 22. The connection piece is slidably attached to a T-bar 24 attached to the support piece 20. The slidable attachment means is a first sleeve 25 which can slide up and down. The first sleeve 25 has a hole through it with an internal screw thread that allows a bolt 26 to be inserted which can be tightened against the T-bar 24 to secure the first sleeve 25 in place on the T-bar 24. It doesn't matter if the hole is located on the top or side face of the first sleeve 25 provided that, when the bolt is tightened, the first sleeve 25 is forced against a surface of the T-bar 24 to stop the first sleeve 25 moving. The connecting piece extends from the first sleeve 25 to a point on the support arm

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22. If the various bolts are loosened, the first sleeve 25 can slide down the T-bar 24 and, because the support arm 22 is pivotally attached to the support piece 20, the support arm 22 can be folded out so it can be laid against the ground. The nut and bolt 21 between the support piece 20 and support arm 22 can then be tightened, and so can the one on the first sleeve 25 , which leaves the support arm 22 strongly supporting the ladder in the open arrangement.

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Claims

1. A stabilisation assembly for a ladder, comprising;
    a. An elongate support piece,
    b. A support arm pivotably connected to the lower end of the support piece via a releasable securing means, such that it can be movable between a first closed arrangement and a second open arrangement, and secured in either arrangement; wherein in the second open arrangement the support arm provides sufficient contact with the ground in use,
    c. An adjustable length connection piece connected to the support piece at a first end via a first connection means and the support arm at a second end via a second connection means,
        wherein at least one of the first or second connection means
        i. is a slidable connection means to facilitate the movement between the first and second arrangements; and
        ii. comprises a releasable securing means to secure the device in the first and/or second arrangement; and
    d. wherein the connection piece is adjustable in length such that the length can vary between the first and second arrangements.

2. The assembly of claim 1, wherein the slidable connection means is indirectly attached to the support piece or support arm via a T-bar.

3. The assembly of any preceding claim, wherein the other of the first or second connection means is a pivotably connection.

4. The assembly of any preceding claim, wherein the elongate support piece is suitable for fixing to a stile of a ladder in use.

5. The assembly of any preceding claim, wherein the slidable connection means is a first sleeve.

6. The assembly of any preceding claim, wherein the slidable connection means has a hole through it with an internal screw thread that allows a bolt to be inserted to provide the releasable securing means.

7. The assembly of claim 6, wherein the hole is located on the top or side face of the slidable connection means.

8. The assembly of any preceding claim, wherein the adjustable length connection piece comprises two strut elements which can slide relative to each other and a releasable securing means.

9. The assembly of claim 8, wherein the two strut elements are arranged adjacent to each other and are held together using a second sleeve comprising a releasable securing means.

10. The assembly of claim 9, wherein each of the two struts has a curved free end.

11. The assembly of claim 8, wherein the two strut elements are arranged such that one of the two strut elements to fit inside the other and be pulled out telescopically, and are held together using a releasable securing means.

12. The assembly of any preceding claim, wherein the support arm has a rubber coating for extra grip on the surface in contact with the ground in use.

13. The assembly of any of claims 1 -11, wherein the support arm has a foam coating for improved contact with the ground in use.

14. The assembly of any preceding claim, wherein the support arm further comprises a releasably secured inner arm for extension of the length of the support arm.

15. The assembly of claim 14, wherein the inner arm extends telescopically.

16. The assembly of claim 14, wherein the inner arm is attached to the support arm via a pivotable connection.

17. The assembly of any preceding claim, wherein the support arm further comprises at least one support spike.

18. The assembly of any preceding claim, wherein the support arm further comprises a visual indicator on the far end.

19. The assembly of any of claims 14-18, wherein the inner arm further comprises a support spike and/or visual indicator.

20. The assembly of any of claims 17 or 19 , wherein the support spike is pivotably connected.

21. The assembly of any of claims 18 or 19, wherein the visual indicator is an illuminated or reflective triangle.

22. The assembly of any preceding claim, wherein the releasable securing means are wingnut and bolts.

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23. A ladder comprising two stiles and at least one assembly according to any of claims 1-22, wherein the elongate support piece is the stile of the ladder.

24. The ladder of Claim 23 wherein two assemblies according to any of claims 1-22 are included, wherein one assembly is on each stile of the ladder.

25. A kit, comprising the assembly of any of claims 1-22 and a ladder.

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Abstract

A stabilisation assembly for a ladder, a ladder comprising at least one stabilisation assembly and a kit of parts. The invention relates to the field of stabilisation assemblies for ladders. The assembly comprises an elongate support piece 20, a support arm 22 pivotably connected to the lower end of the support piece 20 via a releasable securing means 21, and an adjustable length connection piece; for allowing the stabilisation of a ladder on uneven ground in a easily adjustable arrangement comprising a closed and open position. [Figure 4B]

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Figures

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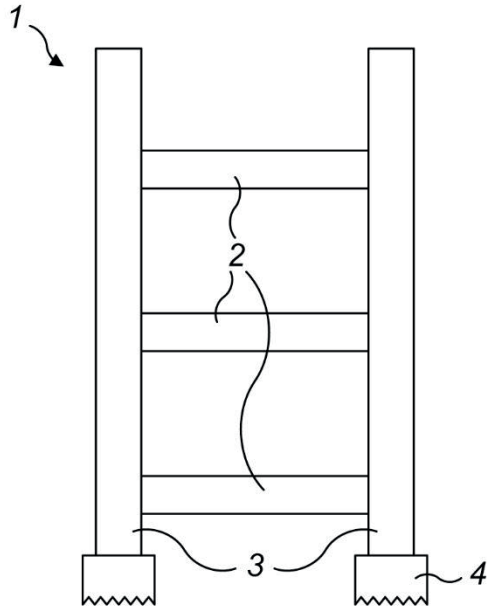

FIG. 1A
(Prior Art)

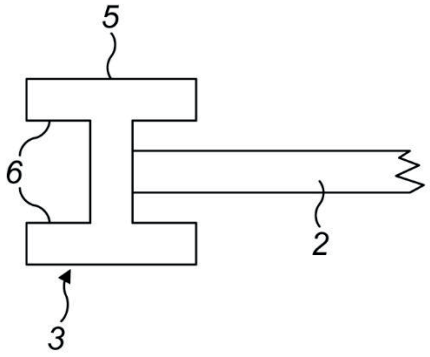

FIG. 1B
(Prior Art)

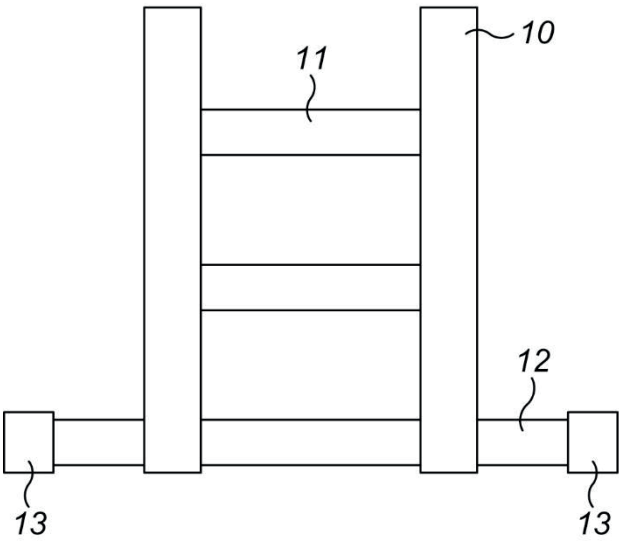

FIG. 2
(Prior Art)

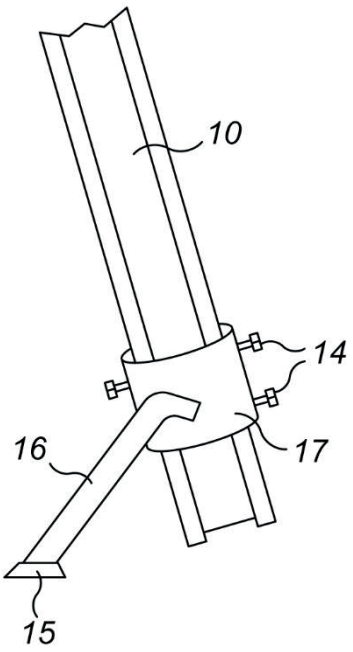

FIG. 3
(Prior Art)

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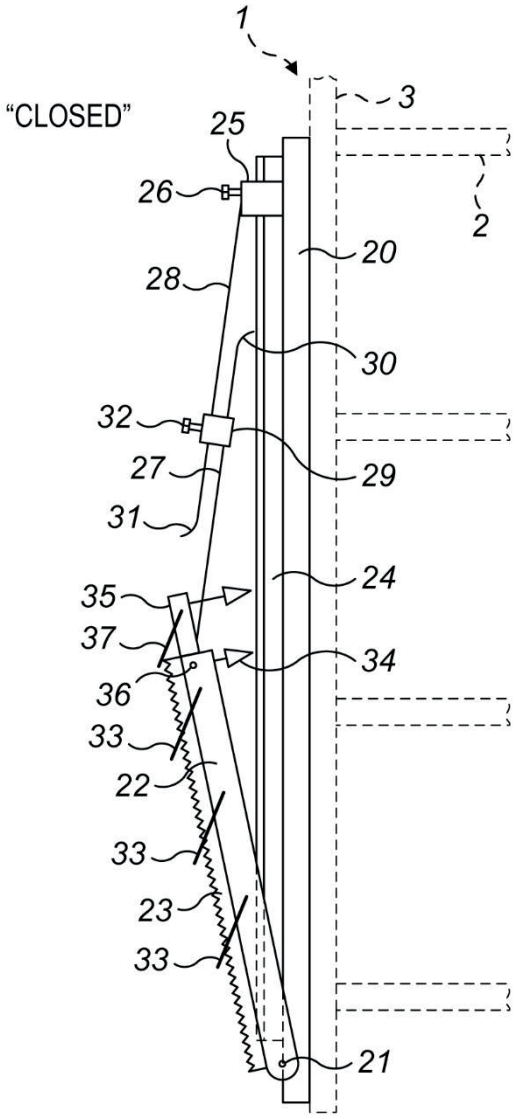

FIG. 4A

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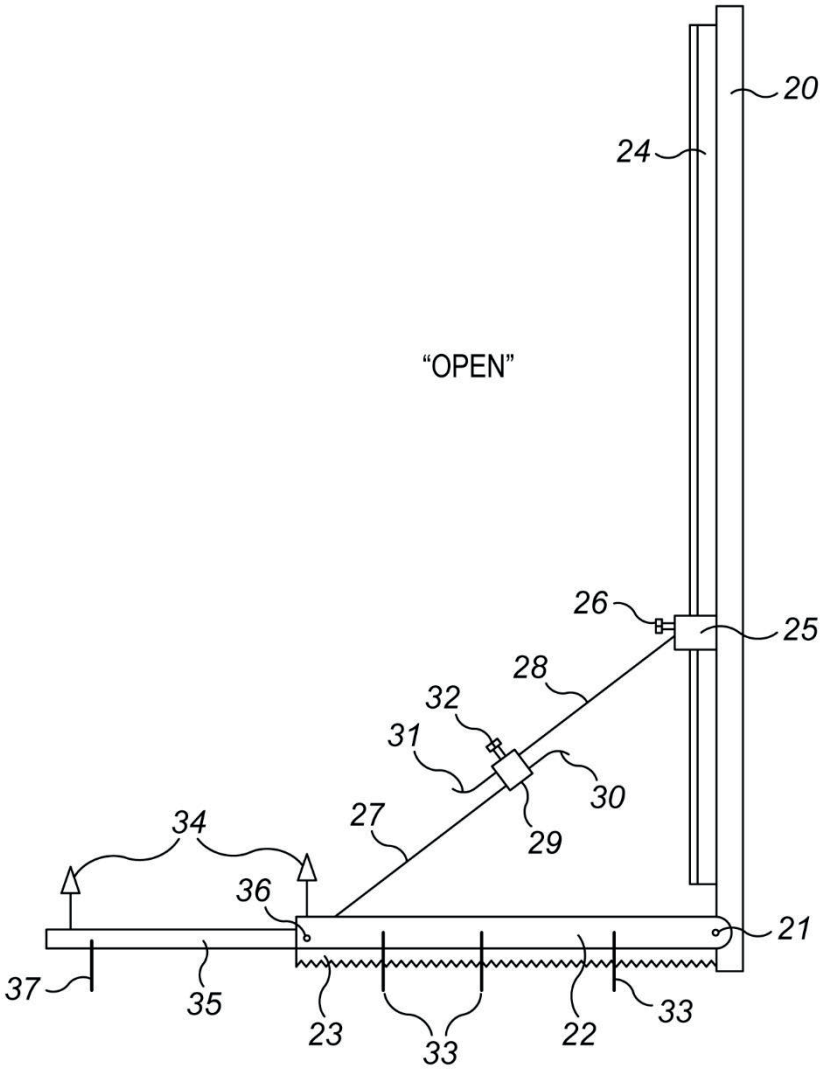

FIG. 4B