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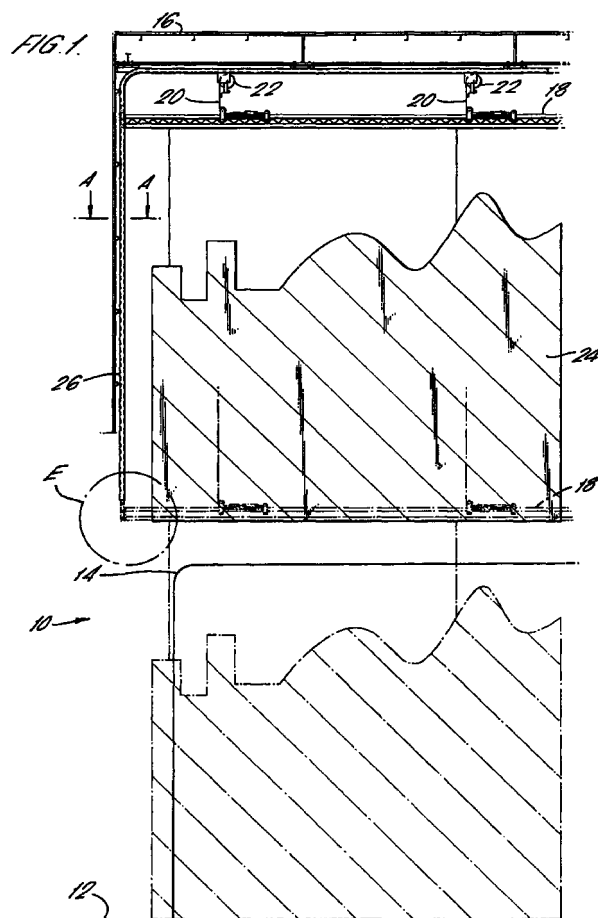
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(54) **Theatrical equipment**

(57) Apparatus for supporting scenery in a stage structure is disclosed. The apparatus comprises an elongate member (18), commonly known as a flying bar, suspended substantially horizontally above a stage and from which scenery items can be suspended. A winch system is used to raise and lower the flying bar. A substantially vertical guide rail (26) is mounted above the stage adjacent each end of the flying bar (18). A chain (28) is freely slidable within each guide rail (26), the lower end of the chain being rigidly secured to one end of the flying bar (18). The links of the chain are configured to permit the chain on one side of the stage to bend towards the opposite side of the stage and to prevent bending in the opposite direction. Thus, the apparatus provides an improved method for guiding and stabilising flying bars and scenery items. It substantially eliminates any side to side motion of the flying bar and allows it to be raised and lowered as desired during a performance without the need for any manual intervention to align the flying bar with the guide rails.



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Description

[0001] The present invention relates to equipment for use in theatres and in particular to an apparatus for supporting, guiding and stabilising so-called "flying bars" and scenery items suspended from them.

[0002] A flying bar is a horizontal member suspended above a stage from which items of scenery can themselves be suspended. Each flying bar extends across the width of the stage and there will normally be a series of flying bars, one behind the other, across the depth of the stage from front to back. Each flying bar is typically supported by cables so that it can be winched up and down. When it is desired to have the scenery item in place on the stage the flying bar is lowered by the winch system so as to take the item of scenery into the correct position on the stage. When the item of scenery is no longer required, the flying bar is winched upwards into a structure known as the fly tower above the stage so as to bring the item of scenery out of view of the audience.

[0003] A system is required to guide and stabilise the flying bar and scenery panel as they are winched up and down to avoid excessive swinging. A particular problem arises in theatres on ships, such as large cruise liners, where the pitch and roll of the ship may cause a problem of the flying bar and scenery panels swinging around in use.

[0004] One conventional system employs a cable fixed taut in a vertical position on each side of the stage. An eye or loop is attached to each end of the flying bar and surrounds the cable. Thus, as the flying bar is winched up and down the eyes or loops run up and down the cables at each side of the stage to provide some guidance. However, this system does not provide much significant stabilisation of the flying bar and scenery panel; and obstructs access to the stage.

[0005] Another known system employs a T-shaped shoe on each end of the flying bar, the main leg of the T extending into a generally U-shaped guide rail. The problem with this system is that the guide rail can only be present in the fly tower above the stage and cannot be extended down below the level of the proscenium arch because it would be in view of the audience and obstruct the wings. Accordingly, when the flying bar is lowered to place the scenery panel on the stage, the T-shaped shoes have to come out of the bottom of the guide rails. Although the end of the guide rail is splayed in order to assist getting the shoe back into the guide rail it is still a relatively tricky task to align the flying bar and the shoes with the guide rails. In practice it is not something that can be done during a performance because it is necessary to have a person at each end of the flying bar assisting entry of the shoe into the guide rail.

[0006] With these problems in mind, the present invention provides apparatus for supporting scenery in a stage structure, comprising an elongate member suspended substantially horizontally above a stage and

from which scenery is suspendable; a winch system operable to move the elongate member between a raised and a lowered position; a substantially vertical guide rail mounted above the stage adjacent each end of the elongate member; and a chain freely slidable in each guide rail, the lower end of the chain being rigidly secured to an end of the elongate member and being configured to permit the chain on each side of the stage to bend towards the opposite side of the stage and to prevent bending in the opposite direction.

[0007] Preferably, the chain comprises a plurality of links pivotally connected to one another, wherein adjacent links have corresponding abutments which are in contact or closely adjacent when the links lie in the same plane and allow movement of a link out of the plane in one direction only.

[0008] In one embodiment, each link comprises a pair of side panels linked by one or more cross-bracing panels and at least one side panel has a projection which abuts against a corresponding shoulder on an adjacent link.

[0009] Preferably, adjacent links of the chain are joined by a pivot pin which also carries a wheel. Additionally, each link may carry at least one additional wheel mounted perpendicular to the first.

[0010] Preferably, the guide rail is a substantially L-shaped member having a vertical leg and a horizontal leg joined by a curved portion having a suitable radius, wherein in the lowered

position of the elongate member, the chain is received in the vertical leg and in the raised position of the elongate member an upper portion of the chain is received in the horizontal leg.

[0011] Conveniently, the guide rail is substantially square in cross section with one corner being open.

[0012] Preferably, the upper end of the chain is free within the guide rail.

[0013] In a second embodiment, the apparatus further comprises a stabilising member extending downwards from a lower end of the chain and rigidly securable to a lower portion of a scenery item suspended from the elongate member.

[0014] The stabilising member may consist of an extension of the chain or a rigid bar or tube rigidly secured to the lower end of the chain.

[0015] The guide rail may include a noise reducing liner and the chain and/or the guide rail may additionally include noise-reducing pivots or rollers.

[0016] In a further aspect, the invention provides a theatre incorporating the aforementioned apparatus.

[0017] In yet another aspect, the invention provides a floating vessel, such as a cruise liner, having a theatre on board which incorporates apparatus of the aforementioned type.

[0018] The invention will now be described in detail, by way of example only, with reference to the accompanying drawings in which:

FIGURE 1 illustrates one half of a stage showing apparatus for supporting a scenery panel in accordance with one embodiment of the present invention; FIGURE 2 shows a cross section of the guide rail of Figure 1 along the line A-A;

FIGURE 3 shows in plan view two links of the chain incorporated in the apparatus of the present invention;

FIGURE 4 is a side view of the links shown in Figure 3;

FIGURE 5 is an enlarged view of the area indicated E in Figure 1; and

FIGURE 6 is a view similar to Figure 1 showing a second embodiment of the invention.

[0019] Figure 1 shows one half of a stage structure 10 and it will be appreciated that the structure is substantially symmetrical and hence the other half corresponds with what is shown in Figure 1. The stage structure 10 include stage 12 and a proscenium arch 14, i.e the arch separating the stage 12 itself from the auditorium. Behind and above the proscenium arch 14 is a structure known as the fly tower 16 from which other equipment is suspended.

[0020] In particular, at least one flying bar 18 is suspended from the fly tower 16 by a number of cables 20 which pass over pullies 22 to a conventional winch system (not shown) allowing the flying bar 18 to be raised and lowered. In the raised position, shown in solid lines in Figure 1, the flying bar 18 and the scenery panel 24 attached to it are raised up into the fly tower 16 above the proscenium arch 14 and out of sight of the audience. When the flying bar 18 is lowered, the scenery panel 24 rests on the stage 12 and the flying bar 18 is located a short distance above the proscenium arch 14 so as to be out of sight to the audience. This is illustrated by a chain dot lines in Figure 1.

[0021] It will be appreciated that a number of flying bars 18 will be provided above the stage, one behind the other so that scenery panels can be positioned in different places over the width and depth of the stage 12 as required.

[0022] Each flying bar 18 may be a single bar or tube or, as illustrated, be a structure made up of two or more tubes connected together in any appropriate form.

[0023] The guide system for the flying bar 18 in accordance with the present invention consists of a pair of substantially L-shaped guide rails 26 (only one of which is shown in Figure 1) attached to the fly tower 16 at each side and above the stage. The vertical leg of the guide rail 26 extends down to a position some distance above the level of the proscenium arch 14 so as to be out of sight to the audience and not to obstruct the wings. The horizontal leg of the guide rail 26 extends sufficiently to accommodate all the chain when the flying bar is fully raised. If necessary the opposing guide rails can overlap vertically.

[0024] The guide rail 26 is substantially square in

cross-section, as shown in Figure 2, with one corner being open. In the vertical leg of the guide rail 26, the opening is in the forward corner closest to the stage. Likewise, in the horizontal leg the opening is in the lower corner closest to the front of the stage.

[0025] A chain 28 is located in the guide rail 26 and is freely slidable within the guide rail. The lower end of the chain 28 is rigidly secured in any convenient manner to the end of the flying bar 18. The upper end of the chain 28 is free but is constrained to move within the guide rail 26. The walls 26a either side of the opening retain the chain 28 in the guide rail 26, particularly in the horizontal leg in which the opening faces partly downwards.

[0026] When the flying bar 18 is fully raised up into the fly tower 16 by the winch system, the chain 28 lies mostly within the horizontal leg of the guide rail 26, with the lower end of the chain passing around the suitably radiused corner of the guide rail 26 into the vertical leg as shown in Figure 1.

[0027] When the flying bar 18 is lowered by the winch system, the flying bar 18 pulls the chain 28 down with it within the guide rail 26. When the flying bar 18 is in the fully lowered position the upper end of the chain 28 has been pulled round the corner of the guide rail 26 so that it is in the vertical leg and the lower end of the chain protrudes out of the bottom of the guide rail 26, as best seen in Figure 5, which shows the chain just coming out of the guide - about mid-way in its full travel distance.

[0028] Thus, the chain 28 is not itself driven by the winch system but is simply pushed or pulled along the guide rail 26 as the flying bar 18 is winched up and down.

[0029] Two links of the chain itself are illustrated in Figures 3 and 4. Each link 30 of the chain 28 is substantially square in cross section and consists of a pair of side panels 32 connected by one or more cross bracing panels 34. The side panel 32a and 32b each have a forward extending arm and an additional projection 36 extending outwardly from the arm 35 to define a shoulder 37. Another projection 38 extends from the rear of the side panels 32a, 32b, also defining a shoulder 39.

[0030] Thus, the link 30 is connected to the adjacent link 30' by a pivot pin 41 which carries a wheel or roller 40 and extends between the arms 35 of the link 30 and into the side panels 32a', 32b' of the adjacent link 30'. The rearward projection 38 from the first link 30 overlaps the forward projection 36' of the second link 30'. In this way, pivoting of the link 30' about the pin 41 and relative to the link 30 in the direction of arrow C in Figure 4 is possible but pivoting in the opposite direction D is prevented by the shoulders 37 and 39 abutting against one another. In other words, when the links 30 and 30' lie in the same plane, the chain can only pivot out of the plane in one direction and is rigid in all other directions.

[0031] To assist with quiet running with the chain 28

in the guide rail 26 and to prevent rattling, the chain links 30 may also include an additional wheel 42 pivotally mounted perpendicular to the wheels 40 and protruding through apertures in the side panels 32. As shown, the wheel 42 is mounted on the uppermost cross bracing panel 34 as seen in Figure 3 but it could also be mounted from the lowermost cross bracing panel or indeed to both. Use of the perpendicular wheels 40 and 42 fixes the position of the chain 28 within the guide rail 26 to prevent it moving from side to side and creating any unwanted noise.

[0032] As described above, the chain 28 is configured so that it can only be bent into a radius in one direction and is rigid in all other directions. It will be appreciated that the concise configuration of the links illustrated in Figures 3 and 4 is not the only way in which a chain can be configured to move in this way and other configurations are still within the scope of the invention.

[0033] The chain 28 is located in the guide rail 26 such that it is able to bend in a direction towards the opposite side of the stage but cannot bend in a direction out towards the wings.

[0034] When the flying bar 18 is raised such that the full length of the chain 28 is within the guide rail 26, then the guide rail itself will prevent bending of the chain. When the flying bar 18 is lowered such that a portion of the chain 28 extends out of the bottom of the guide rail 26, the chain 28 stabilises the flying bar 18 and prevents any side to side movement because any movement towards the left in Figure 1 will be resisted by the chain 23 on the left-hand side of the stage 12 and any movement towards the right-hand side will be resisted by the chain (not shown) on the right-hand side of the stage 12. Thus, any side to side swinging motion of the flying bar 18 is prevented. Furthermore, because the chain extends up inside the guide rail 26, when the flying bar 18 is winched upwards the rest of the chain 28 will automatically pass into the guide rail and there is no need for any human intervention to ensure that the flying bar 18 is in alignment with the guide rail 26. Thus, a significant feature of the invention is the ability to lower the flying bar to within one metre or so of the stage to change the scenic elements and still have the flying bar guided.

[0035] In a second embodiment of the invention, illustrated in Figure 6, further means is provided to stabilise the scenery panel 24 suspended from the flying bar 18, down to its lower edge which is remote from the flying bar 18. One possibility is simply to extend the chain 28 beyond the point at which it is connected to the flying bar 18 down towards the lower edge of the scenery 24, to which it is connected by a rigid link.

[0036] However, even when the flying bar 18 is fully raised up into the fly tower 16, the extra portion of the chain extending from the flying bar 18 down the side of the scenery panel 24 will be in the vertical leg of the guide rail 26. The flying bar 18 cannot be raised any further to a point where the extra portion of the chain needs to pass round the bend radius of the guide rail 26

into the horizontal leg. Therefore, it is not in fact necessary to use the same sort of chain 28 to extend from the flying bar 18 down the side of the scenery panel 24. Instead, it is possible simply to use a rigid bar or tube 40 which is rigidly attached to the lower end of the chain 28 and the flying bar 18 and rigidly attached to a lower portion of the scenery 24. When the flying bar 18 is fully raised into the fly tower 16, the rigid bar or tube 40 is simply pulled by the chain 28 up into the vertical leg of the guide rail 26. Using a bar or tube 40 is of course cheaper and may be lighter than using the chain 28.

[0037] To reduce noise as the chain 26 is pushed and pulled along the guide rail 26, the guide rail may have a plastic liner and the chain and/or the guide rail may be provided with plastic rollers or pivot pins.

[0038] Thus, the present invention provides an improved apparatus for guiding and stabilising flying bars and scenery items in theatre structures. The apparatus substantially eliminates any side-to-side motion of the flying bar 18 and allows the flying bar to be raised and lowered as desired during a performance without the need for any manual intervention to align the flying bar with a guidance system. The skilled person will appreciate that the precise configuration of the invention as described herein is not the only way in which the invention can be embodied and various modifications can be envisaged without departing from the scope of the invention.

Claims

1. Apparatus for supporting scenery in a stage structure, comprising an elongate member suspended substantially horizontally above a stage and from which scenery is suspendable; a winch system operable to move the elongate member between a raised and a lowered position; a substantially vertical guide rail mounted above the stage adjacent each end of the elongate member; and a chain freely slidable in each guide rail, the lower end of the chain being rigidly secured to an end of the elongate member and being configured to permit the chain on one side of the stage to bend towards the opposite side of the stage and to prevent bending in the opposite direction.
2. Apparatus as claimed in claim 1, wherein the chain comprises a plurality of links pivotally connected to one another, wherein adjacent links have corresponding abutments which are in contact or closely adjacent when the links lie in the same plane and allow movement of a link out of the plane in one direction only.
3. Apparatus as claimed in claim 2, wherein each link comprises a pair of side panels linked by one or more cross-bracing panels and wherein at least one side panel has a projection which abuts against

a corresponding shoulder of an adjacent link.

4. Apparatus as claimed in any preceding claim, wherein adjacent links of the chain are joined by a pivot pin carrying a wheel. 5
5. Apparatus as claimed in claim 4, wherein each link carries at least one additional wheel mounted perpendicular to the wheels between adjacent links. 10
6. Apparatus as claimed in any preceding claim, wherein the guide rail is a substantially L-shaped member having a vertical leg and a horizontal leg joined by a curved portion having a suitable radius, wherein in the lowered position of the elongate member, the chain is received in the vertical leg and in the raised position of the elongate member an upper portion of the chain is received in the horizontal leg. 15 20
7. Apparatus as claimed in any preceding claim, wherein the guide rail is substantially square in cross section with one corner being open. 25
8. Apparatus as claimed in any preceding claim, wherein the upper end of the chain is free within the guide rail.
9. Apparatus as claimed in any preceding claim, further comprising a stabilising member extending downwardly from a lower end of the chain and rigidly securable to a lower portion of a scenery item suspended from the elongate member. 30 35
10. Apparatus as claimed in claim 7, wherein the stabilising member comprises an extension of the chain.
11. Apparatus as claimed in claim 7, wherein the stabilising member comprises a rigid bar or tube rigidly secured to the lower end of the chain. 40
12. Apparatus as claimed in any preceding claim wherein the guide rail includes a noise reducing liner. 45
13. Apparatus as claimed in any preceding claim, wherein the chain and/or the guide rail includes noise reducing pivots or rollers. 50
14. A theatre incorporating apparatus as claimed in any preceding claim.
15. A floating vessel having a theatre incorporating apparatus as claimed in any preceding claim. 55

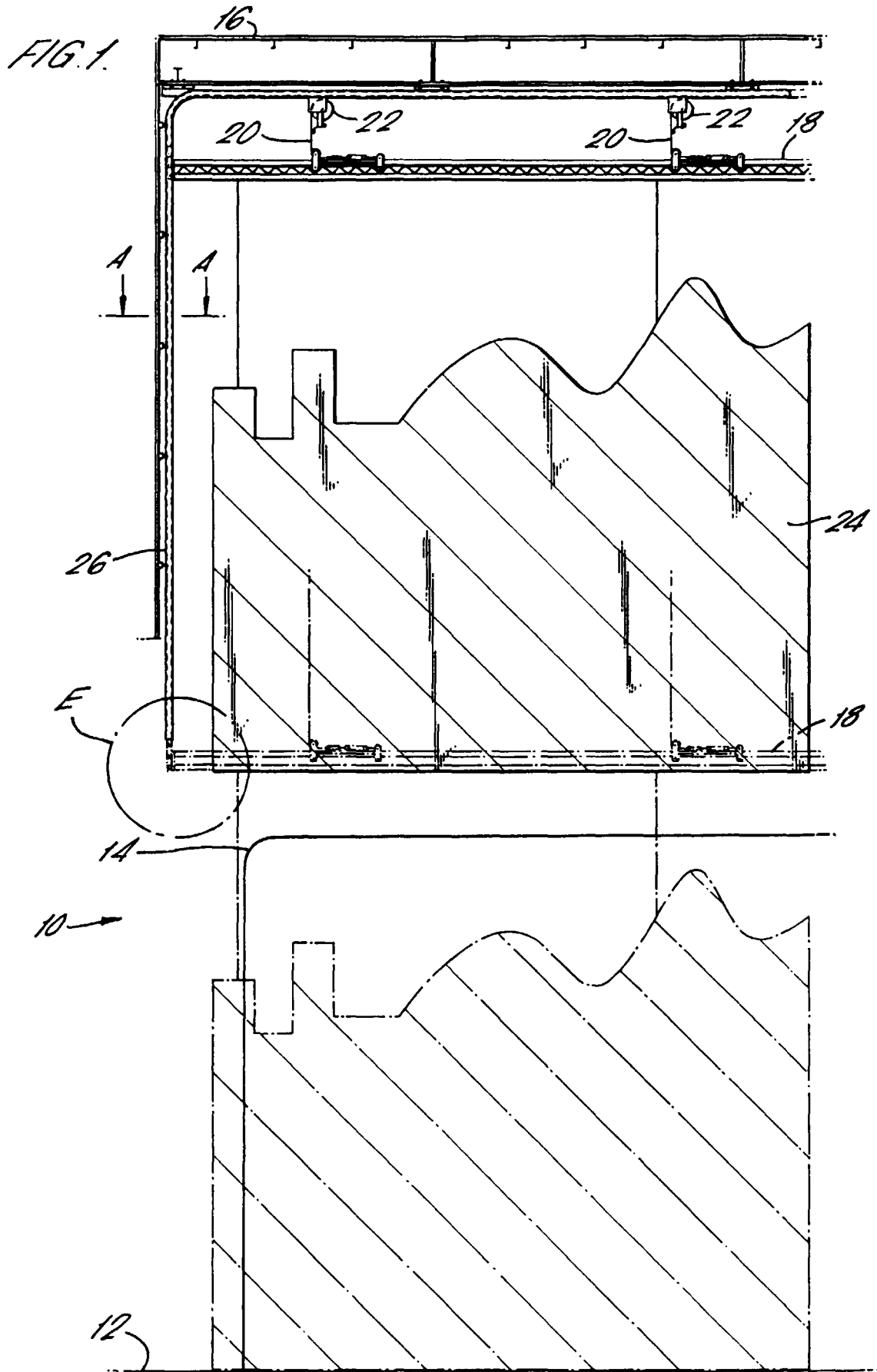
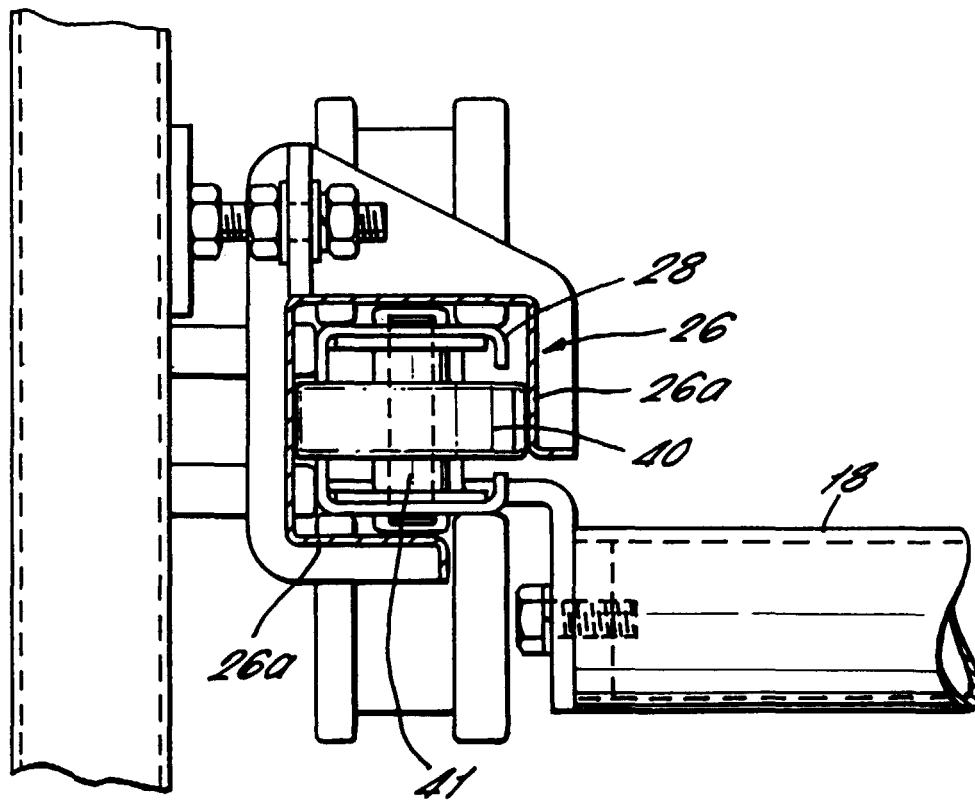


FIG. 2.



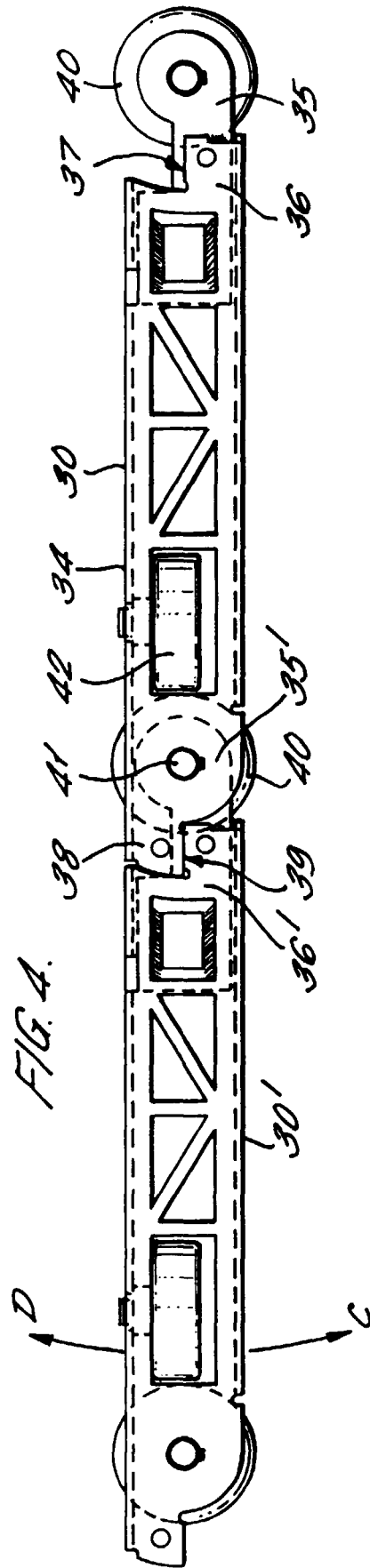
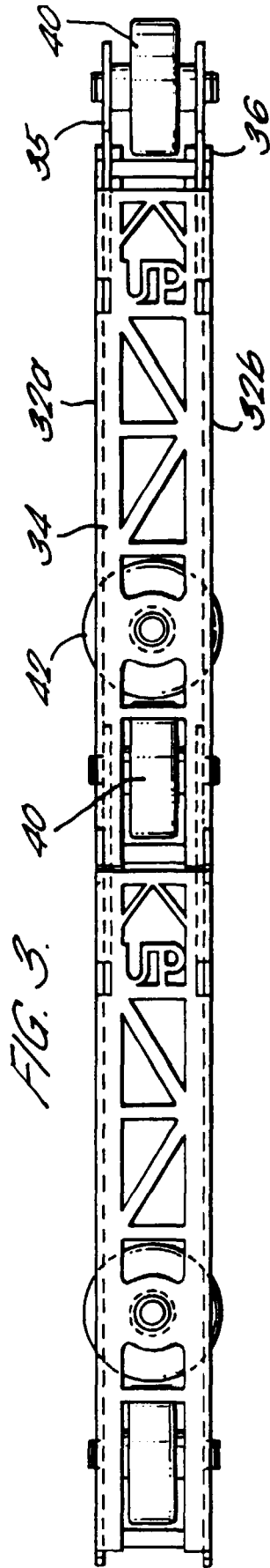


FIG. 5.

