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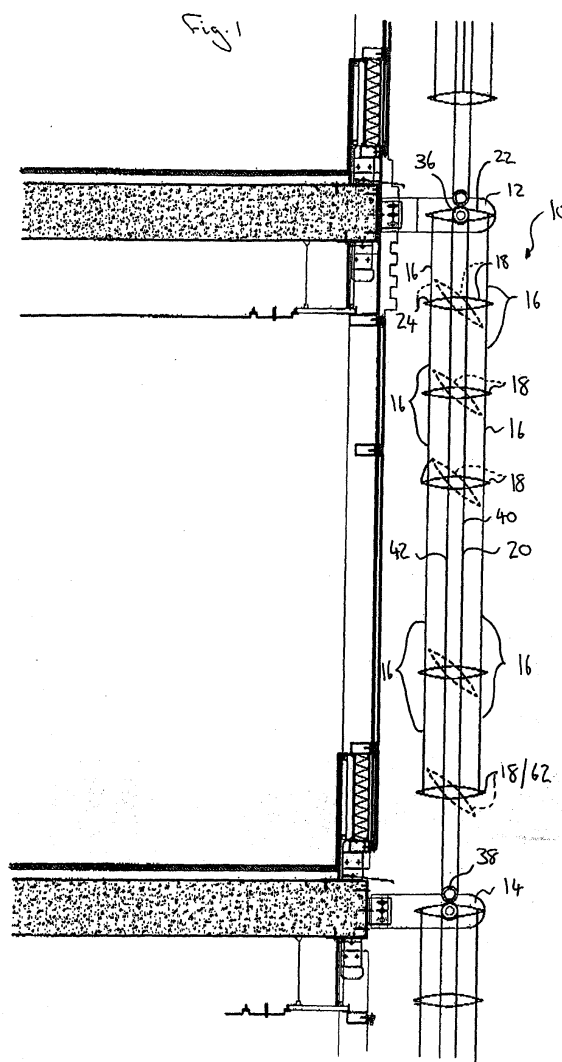
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### (54) **A retractable louvre system**

(57) A retractable louvre system (10) comprising one or more support members (12,14), a plurality of flexible elongate louvre interconnecting elements (16), a plurality of angularly displaceable louvres (18) attached to the louvre interconnecting elements, and one or more elongate tensioning elements (20) for tensioning the flexible louvre interconnecting elements (16) and for retracting the louvres (18) to form a stacked arrangement.



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## Description

**[0001]** This invention relates to a retractable louvre system.

**[0002]** Louvre systems for structures, such as buildings, whether erected internally or externally, have a typically large footprint and are expensive due to the components used to ensure structural stability and safety.

**[0003]** Furthermore, it can often be problematic to clean the, typically glass, surface shaded by a fixed and non-retractable louvre system.

**[0004]** The present invention seeks to overcome these problems.

**[0005]** According to the present invention, there is provided a retractable louvre system comprising one or more support members, a plurality of flexible elongate louvre interconnecting elements, a plurality of angularly displaceable louvres attached to the louvre interconnecting elements, and one or more elongate tensioning element for tensioning the flexible louvre interconnecting elements and for retracting the louvres to form a stacked arrangement..

**[0006]** Preferable and/or optional features of the present invention are set forth in claims 2 to 16.

**[0007]** The present invention will now be described, by way of example, with reference to the accompanying drawings, wherein :

Figure 1 is a schematic side view of a first embodiment of the retractable louvre system, in use and in a first condition, in accordance with the present invention,

Figure 2 is a schematic side view of the retractable louvre system shown in Figure 1, in a second condition,

Figure 3 is an enlarged schematic side view of part of the retractable louvre system,

Figure 4 is an enlarged side view of another part of the retractable louvre system,

Figure 5 is a front view of the part shown in Figure 4,

Figure 6 is a perspective end view of one louvre of the retractable louvre system,

Figure 7 is a schematic longitudinal sectioned view of part of the louvre, and

Figure 8 is a schematic perspective view of part of a second embodiment of the retractable louvre system, in accordance with the present invention.

**[0008]** Referring firstly to Figures 1 to 7, a retractable louvre system 10 is shown which comprises a top support member 12, a bottom support member 14, a plural-

ity of flexible elongate louvre interconnecting elements 16, a plurality of louvres 18, and two elongate tensioning elements 20 (only one being shown).

**[0009]** The top and bottom support members 12 and 14 are attached to a suitable surface, typically a wall above or below a window, and comprise a bracket portion 22.

**[0010]** The louvres 18 are interconnected by independent sets of the flexible elongate louvre interconnecting elements 16. Each independent set typically comprises four louvre interconnecting elements 16, preferably in the form of cables. The tail-end louvre 24 of the plurality of louvres 18 is suspended from the top bracket portion 22 of the top support member 12 by a first independent set 26 of the louvre interconnecting elements 16. Each following louvre 18 is suspended, in a similar fashion, from the immediately adjacent louvre 18 above by a second set 28 of the louvre interconnecting elements 16.

**[0011]** The top bracket portion 22 includes two motorised spools 30 (only one shown in Figure 3) to which two louvre interconnecting elements 32 of the first set 26 are respectively attached. The two louvre interconnecting elements 32 typically support only the externally facing longitudinal edge 29 of the tail-end louvre, but may alternatively support the opposite longitudinal edge. A bearing guide surface 31, which may be a guide pulley, is also provided in the top bracket portion 22 to guide each louvre interconnecting element 32 as it is wound off and taken up by its spool 30.

**[0012]** The elongate tensioning elements 20 are endless flexible elongate elements and extend along opposite transverse sides 34 of the louvres 18, perpendicularly or substantially perpendicularly to the longitudinal extent of the louvre 18 and in parallel or substantially in parallel with the major portion of the louvre interconnecting elements 16 when they are in tension. Top and bottom pulleys 36 and 38 are rotatably supported by the top and bottom bracket portions 22, respectively, and each endless tensioning element 20 is entrained around the respective pulleys 36 and 38 to provide a front run 40 and a back run 42. An electric motor 44 is mounted on the top bracket portion 22 and synchronously drives each top pulley 36. The bottom pulley 38 acts as a guide.

**[0013]** It is, however, possible to provide a single endless tensioning element 20 which may extend down only one transverse side 34, or pass through a transverse opening formed in the louvres 18.

**[0014]** As best shown in Figures 4 and 5, the bottom bracket portion 22 is a tensioning bracket which has two screw-threaded shafts 46, which are received through part of the bottom support member 14, and two tension adjusting elements 48, typically being a nut and washer, each threadingly engaged with a respective shaft 46. The tension adjusting elements 48, when moved, move the tensioning bracket 22 relative to the bottom support member 14, which has the effect of adjusting the tension in the endless tensioning elements 20.

**[0015]** A coiled spring 50 is also received on each shaft 46, interposed between the tension adjusting element 48 and the bottom support member 14. The coiled spring 50 provides acoustic damping.

**[0016]** As shown in Figure 6, a slide member 52 is supported on the transverse sides 34 for angular displacement relative to the transverse extent of the respective louvre 18. The slide member 52 includes two tubular receiving parts 54 and 56 through which the two runs 40 and 42 of each endless tensioning element 20 are respectively received. The slide member 52 also includes a through-bore 58 which passes through or substantially through the centre of rotation of the slide member 52, in parallel or substantially parallel with the tubular receiving parts 54 and 56, and through which an elongate guide member 60 is slidably received.

**[0017]** The lead louvre 62 of the plurality of louvres 18 is fixedly attached to the front run 40 of each endless tensioning element 20. Attachment is effected by providing two screw-threaded fastening elements 64 which extend through the wall of the receiving part 54 and engage with the endless tensioning element 20. The other receiving part 56 of the slide member 52 of the lead louvre 62 is slidable on the back run 42 of each endless tensioning element 20.

**[0018]** It should be noted that both receiving parts 54 and 56 of the slide members 52 of the remaining louvres 18 are slidable on the front and back runs 40 and 42 of the endless tensioning elements 20.

**[0019]** The elongate guide member 60 is a flexible elongate member, typically a cable, which is attached to the tensioning bracket 22. The elongate guide member 60 has a screw-threaded end part 66 at each end (only one shown in Figures 4 and 5), and a second tension adjusting element 68 is threadingly engaged on the end part 66 to bear against the bottom support member 14. A similar arrangement (not shown) is provided on the top support member 12, and by moving one or both second tension adjusting elements 68, the guide member 60 can be suitably tensioned.

**[0020]** The tension imparted to the guide member 60 typically exceeds that of the endless tensioning elements 20. The guide member 60 thus prevents the louvres 18 from drooping and/or swinging, especially when mounted, for example, horizontally or sideways and/or when externally mounted and subjected to environmental conditions, such as wind.

**[0021]** Referring to Figure 7, each louvre 18 includes a plurality of bottomed-bores 70 (only one shown in Figure 7), an urging member, typically in the form of a compression spring 72, axially received and retained in each bore 70 by a retaining plate 74, and a guide element 76, which may be a pulley or a static or substantially static bearing surface, mounted adjacent to the opening of each bore 70. Each louvre interconnecting element 16 extends around the guide element 76 and into a respective bottomed-bore 70, coaxially with the spring 72. A stop 78 is positioned on the louvre interconnecting ele-

ment 16, at or adjacent to the end received in the bore 70, and bears against the distal end 80 of the spring 72.

**[0022]** The compression springs 72 are relatively lightly sprung so that the louvre interconnecting elements 16 are only drawn into the bores 70 when the louvres 18 are drawn towards each other.

**[0023]** When the louvres 18 are unfurled, the front run 40 becomes a tensioning run in the direction of the bottom support member 14. The endless tensioning element 20, through the urging of the driven pulley 36, causes the louvre interconnecting elements 16 to be extracted from their respective bores 70 to a maximum or substantially maximum state and tensioned. In this state, when the motorised spools 30 wind off or take up the two louvre interconnecting elements 32, the angle of all of the louvres 18 is adjusted.

**[0024]** When the louvres 18 are retracted, the front run 40 becomes a retracting run in the direction of the top support member 12. As the lead louvre 62, which is attached to the endless tensioning element 20, moves towards the top support member 12, it collects the remaining louvres 18 to form a stacked arrangement adjacent the top support member 12. As the tension in each set of louvre interconnecting elements 16 decreases, due to the louvres 18 being moved towards each other, the louvre interconnecting elements 16 are drawn, by the compression springs 72, into the respective bores 70.

**[0025]** Obviously, if the lead louvre 62 is fixedly attached to the back run 42 instead of the front run 40, then the back run 42 becomes the tensioning and retracting runs.

**[0026]** The louvres 18 can be, typically opaque, solar shades, or can be glass or transparent / translucent laminates. They may range from 50 millimetres (mm) to 500 mm and above and be shaped as simple slats or aerofoil extrusions.

**[0027]** The louvres 18 may also incorporate one or more photovoltaic cells (not shown) by which the incident external light can be utilised to generate a useful electric current to, for example, power internal lighting of a building. In addition, a self cleaning glass, such as Pilkington Activ RTM may be incorporated into the louvres 18 along with the photovoltaic cell(s) to ensure a maximum amount of energy is obtained with minimal maintenance, i.e. cleaning of the surface of the louvre.

**[0028]** The glass of the glass louvres 18 may incorporate a plastic sheet or film (not shown) which acts to refract external light into the building. This type of glass is known as Serraglaze RTM, and benefits buildings by increasing the amount of external light transmitted into a room, thereby reducing the need for additional or supplementary artificial lighting.

**[0029]** The glass of the glass louvres 18 may alternatively or additionally incorporate a vapour deposited pyrolytic or hard coat, such as Pilkington Reflectafloat RTM or a Low-E coating (not shown). The Reflectafloat RTM and Low-E coating are a thin metallic coating on the

glass which reflects a higher proportion of incident infrared rays than plain or normal glass while allowing the transmission of visible light. The louvres 18 may thus be sealed units in order to incorporate such a feature.

[0030] Referring to Figure 8, a second embodiment of part of the louvre system 10 is shown. In this embodiment, references which correspond to the first embodiment refer to the same or similar parts, and as such will not be described again.

[0031] In the second embodiment, the endless tensioning element 20 is replaced by a non-continuous tensioning element 20'. In this case, the front run 40 is wound off and taken up by a first spool 82, and the back run 42 is wound off and taken up by a second spool 84. Both spools 82 and 84 are held on a common spindle 86, which is driven by the motor 44.

[0032] It will be understood that, although reference has been made to 'top' and 'bottom', the retractable louvre system 10 can be positioned horizontally or sideways, and as such these terms should be construed accordingly.

[0033] Furthermore, the tensioning bracket 22, motorised spools 30, and pulley 36 and motor 44 could be positioned on the other support member.

[0034] The bottom guide pulley 38 could be a static or substantially static bearing guide surface; and the top and bottom support members 12 and 14 may be independent of each other, or formed into a single continuous support member.

[0035] It is thus possible to provide a safe and structurally stable internal or external retractable louvre system that has a small footprint on the area covered and which has a run which is capable of being a tensioning run when moved in one direction so that the louvres are unfurled, and being a retracting run when moved in the opposite direction so that the louvres are retracted. It is also possible to provide a retractable louvre system which, when in a retracted state, conceals the untensioned louvre interconnecting elements.

[0036] The embodiments described above are given by way of example only and various modifications will be apparent to persons skilled in the art without departing from the scope of the invention as defined by the appended claims.

## Claims

1. A retractable louvre system comprising one or more support members, a plurality of flexible elongate louvre interconnecting elements, a plurality of angularly displaceable louvres attached to the louvre interconnecting elements, and one or more elongate tensioning elements for tensioning the flexible louvre interconnecting elements and for retracting the louvres to form a stacked arrangement.

2. A retractable louvre system as claimed in claim 1,

wherein the elongate tensioning element is an endless flexible elongate element.

3. A retractable louvre system as claimed in claim 2, wherein there are two said support members which are spaced from each other, the endless flexible elongate element being entrained around a motor-driven pulley mounted on one of the support members and a guide mounted on the other support member.

4. A retractable louvre system as claimed in claim 1, wherein the elongate tensioning element is a flexible elongate element, the two ends of which are attached to separate spools driven by a motor.

5. A retractable louvre system as claimed in claim 4, wherein there are two said support members which are spaced from each other, the separate spools being coaxially mounted on one of the support members, and the flexible elongate element being entrained around a guide mounted on the other support member.

6. A retractable louvre system as claimed in any one of the preceding claims, wherein only the lead louvre of the plurality of louvres is fixedly attached to the elongate tensioning element.

7. A retractable louvre system as claimed in claim 6 when dependent on claim 3 or claim 5, further comprising a tensioning bracket which has a screw-threaded shaft and which rotatably supports the guide, the screw-threaded shaft being received through one of the support members and being screw-threadingly engaged with a tension adjusting element which moves the bracket relative to the support member to adjust the tension in the elongate tensioning element.

8. A retractable louvre system as claimed in claim 7, wherein the tensioning means also includes acoustic damping.

9. A retractable louvre system as claimed in claim 8, wherein the acoustic damping is in the form of a spring interposed between the tension adjusting element and the support member.

10. A retractable louvre system as claimed in any one of the preceding claims, wherein each louvre is attached to an adjacent louvre by an independent set of the louvre interconnecting elements, and the tail-end louvre is attached to one of the support members by one said independent set of the louvre interconnecting elements.

11. A retractable louvre system as claimed in claim 10,

wherein each louvre includes a spring mechanism for retracting the respective independent set of flexible elongate louvre interconnecting elements as the louvres are retracted.

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12. A retractable louvre system as claimed in claim 11, wherein the spring mechanism comprises a plurality of bores formed in each louvre, and a coiled spring axially retained in each bore, each flexible elongate louvre interconnecting element extending axially into a respective said bore and having a stop which is positioned at or adjacent to the end received in the bore and which bears against the distal end of the coiled spring, the coiled spring drawing the flexible elongate louvre interconnecting element into the bore when the louvres are retracted.
- 10
- 15
13. A retractable louvre system as claimed in any one of claims 10 to 12, wherein the support member to which the tail-end louvre is attached includes a motorised spool by which the louvre interconnecting elements, which support one longitudinal edge of the tail-end louvre, can be wound off and taken up to adjust the angle of the louvres.
- 20
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14. A retractable louvre system as claimed in any one of the preceding claims, further comprising a plurality of slide members attached to the louvres and through which an elongate guide member is slidably received.
- 30
15. A retractable louvre system as claimed in claim 14, wherein the elongate guide member is a flexible elongate member.
- 35
16. A retractable louvre system as claimed in any one of the preceding claims, wherein the elongate tensioning element has a run which, when moved in one direction, acts as a tensioning run which tensions the louvre interconnecting elements and, when moved in the opposite direction, acts as a retracting run which retracts the louvres.
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Fig. 1

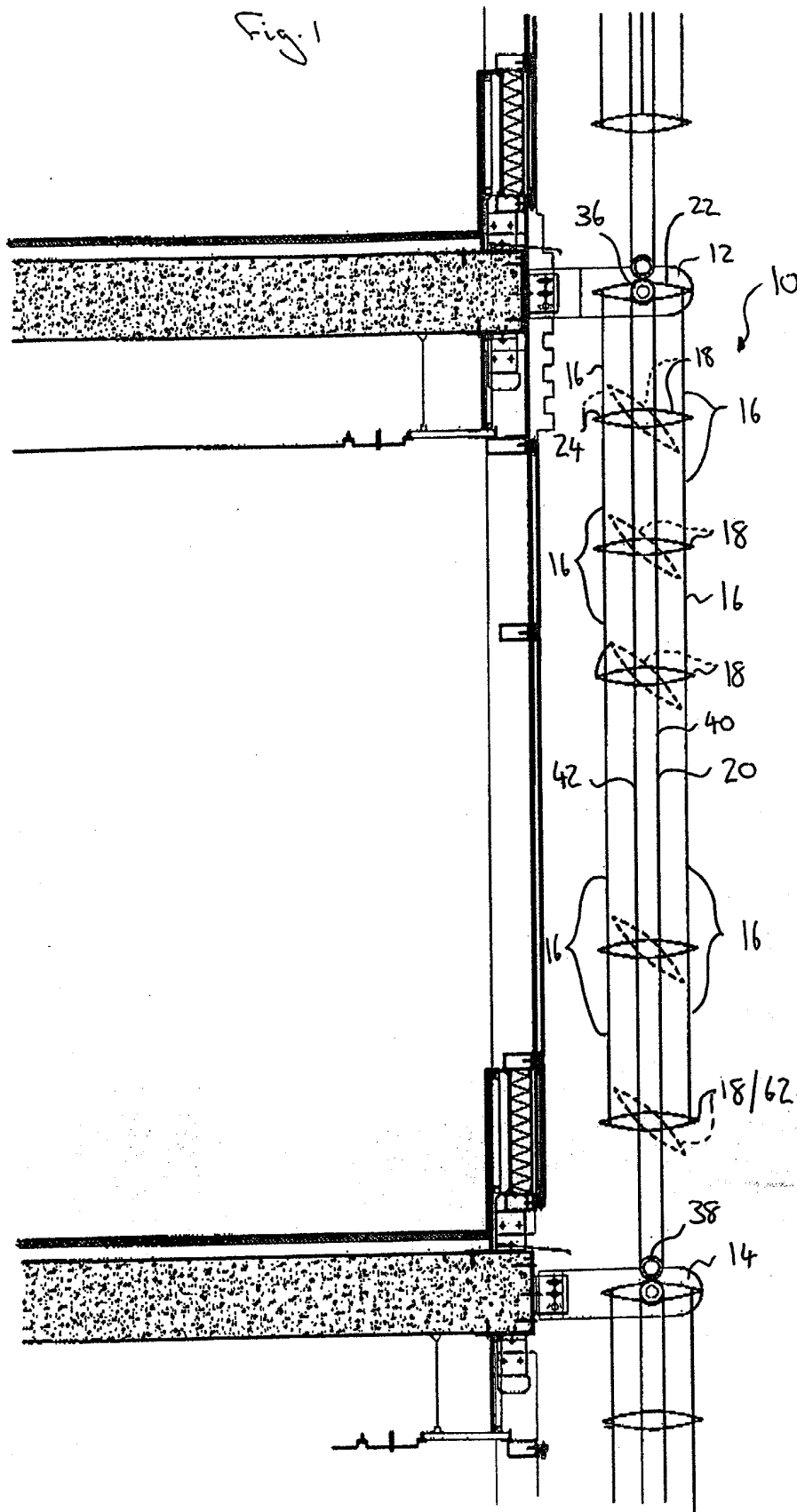
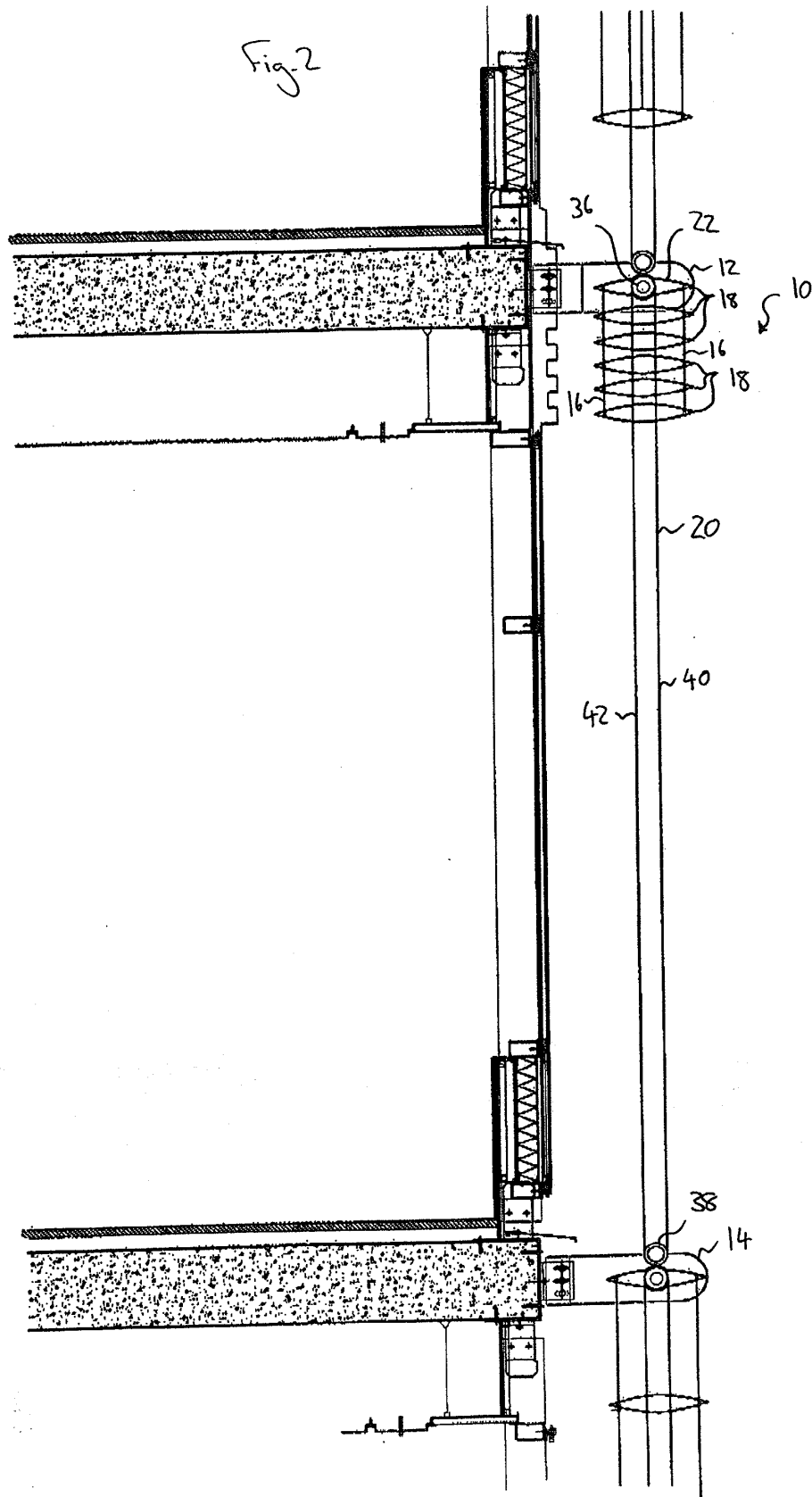
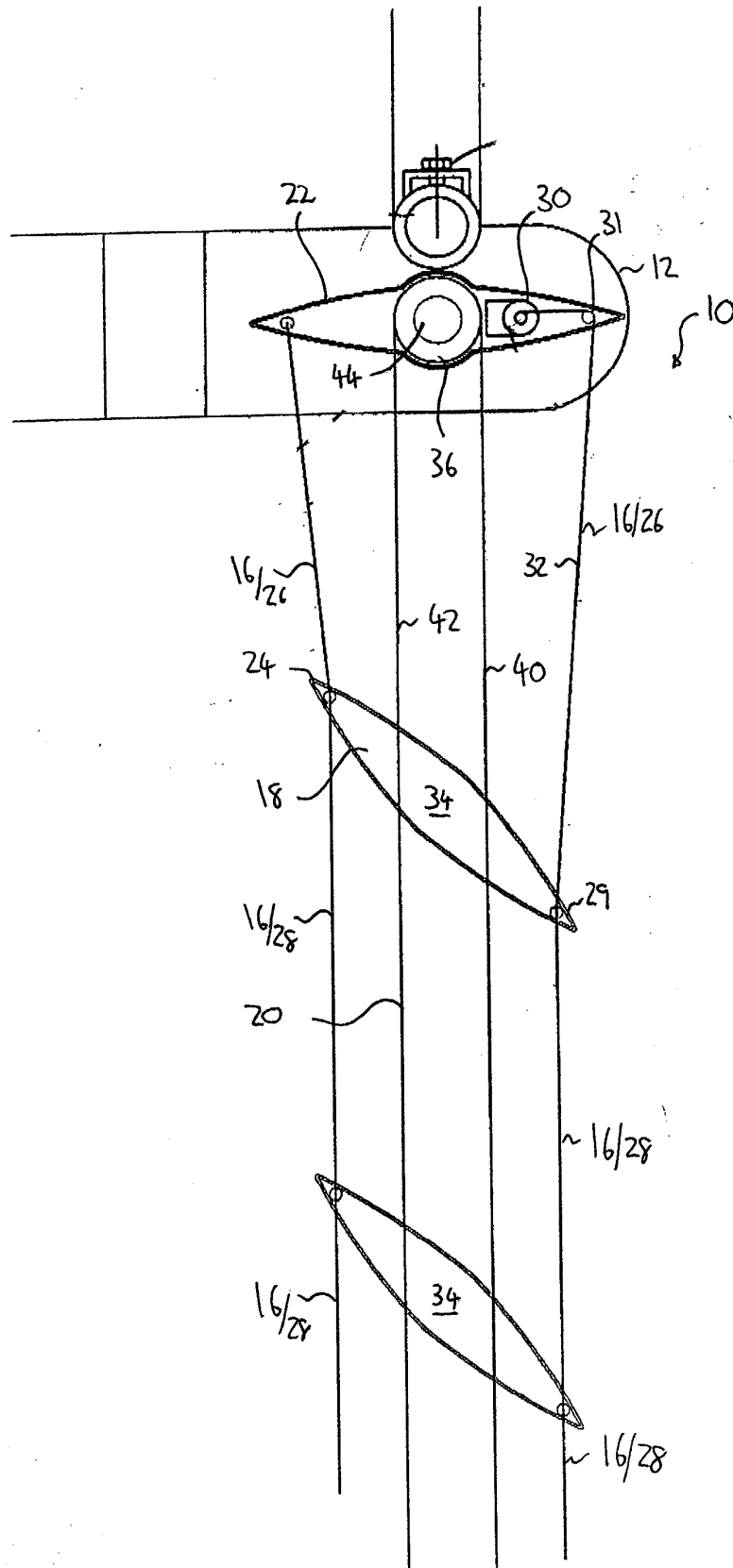
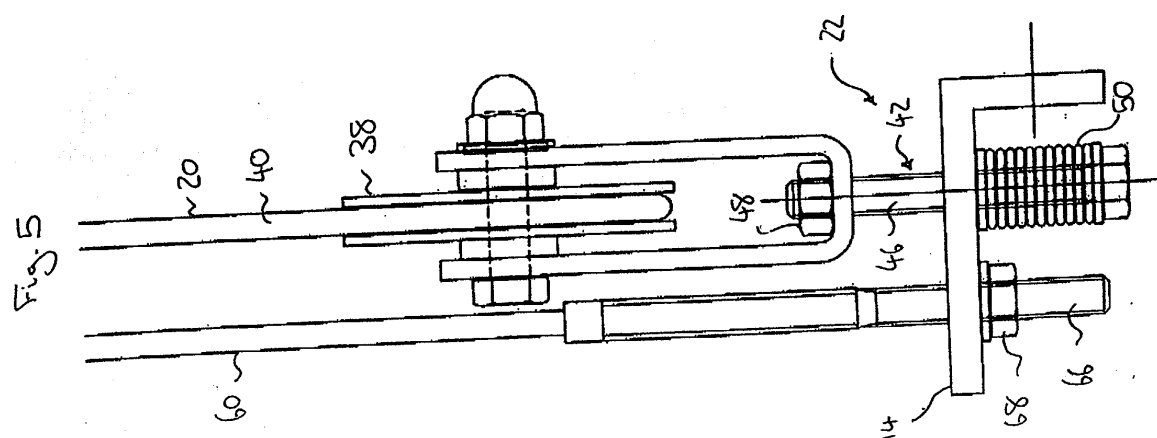
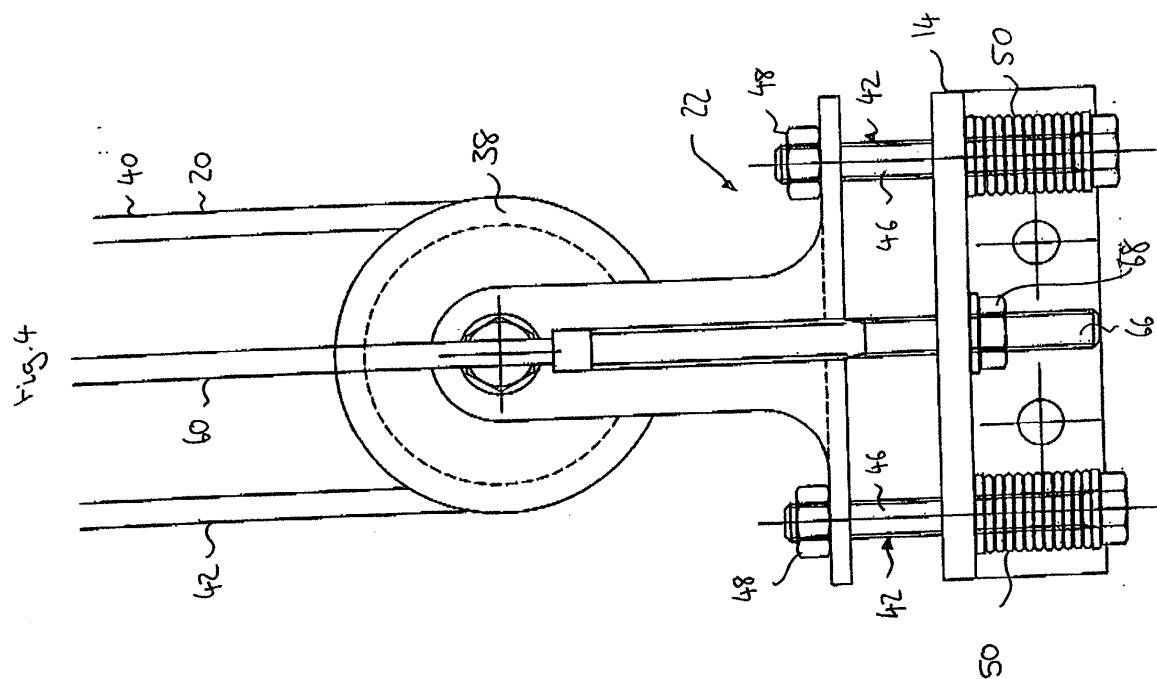


Fig. 2









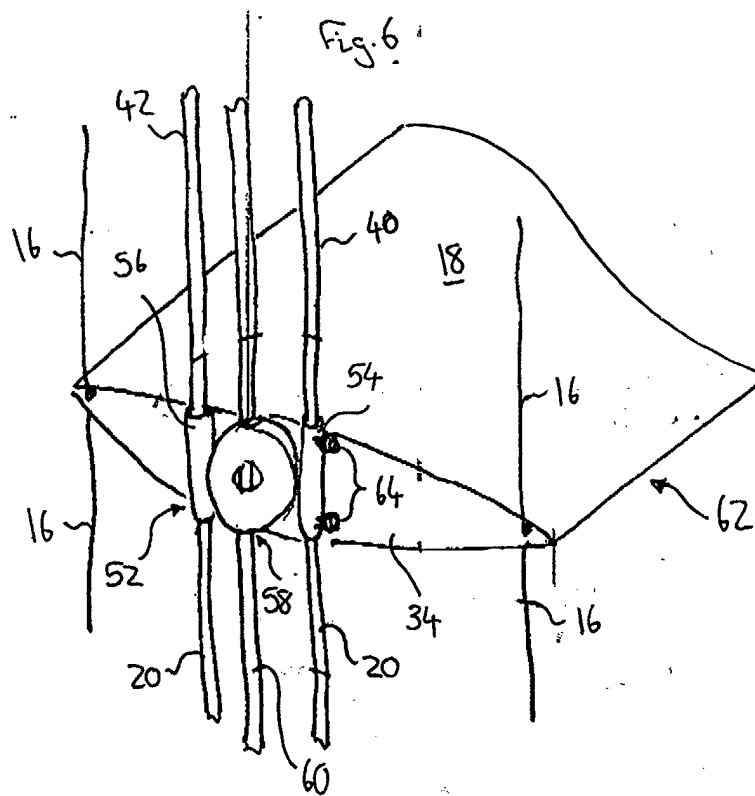


Fig. 7

