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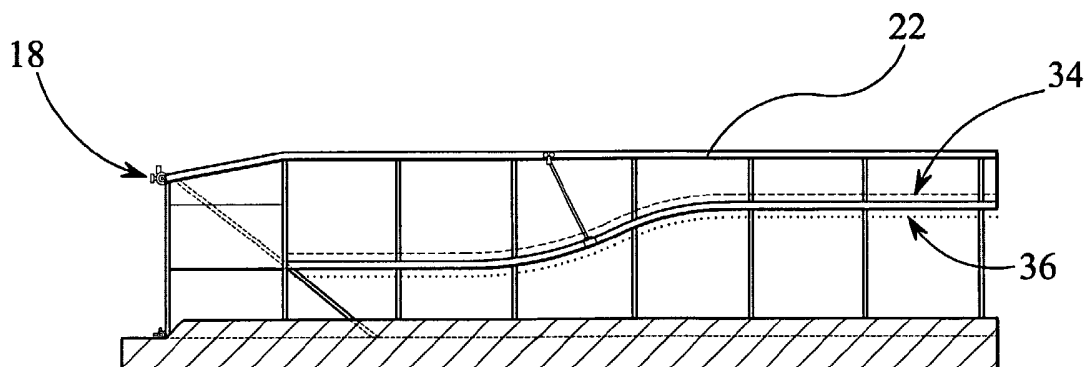
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(54) Title: POLYTUNNEL SYSTEM



(57) Abstract: A polytunnel system comprising a plurality of polytunnel supports (10, 12) and track member (22) interconnecting at least some of the supports (10, 12). The system may be used as part of a conveyer for use in the transportation of items along a polytunnel. Alternatively it may be used to drive, for example, a vent adjustment system.

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POLYTUNNEL SYSTEM

The invention relates to a polytunnel system for use in the cultivation of crops, for example strawberries.

The use of polytunnels to provide better, more easily controllable and more consistent growing conditions is becoming increasingly common. However, it has  
5 been found that the cultivation of crops in polytunnels tends to be relatively labour intensive. It is an object of the invention to provide a polytunnel system whereby the completion of certain tasks can be automated. For example,, the transportation of produce and/or tools into or through the tunnel may be automated. Further,  
10 venting of the tunnel by raising the sides thereof, for example to control the temperature within the tunnel or to protect the tunnel structures during high wind conditions.

Co-Pending British Patent Application No. 0210091.5 describes a polytunnel system having an end frame which is sufficiently rigid that it can carry drive means  
15 for use in operating a range of pieces of machinery. The end frame also permits a common drive means to be used to operate machinery in a number of adjacent polytunnels.

According to one aspect of the invention there is provided a polytunnel system comprising a plurality of polytunnel supports, and a conveyor track member

interconnecting at least some of the polytunnel supports.

The conveyor track member is conveniently of substantially rigid form, improving the structural integrity of the polytunnel.

Typically a polytunnel includes two parallel rows of leg members, each leg member of one row being connected to a leg member of an adjacent row by means of a hoop member such that the leg members support the hoop member. In such an arrangement, the conveyor track member conveniently interconnects the hoop members.

The conveyor track member may be designed to allow one or more carriers to be moved along the polytunnel, for example to assist in the transport of products into or out of the tunnel. In such an arrangement, a cable is conveniently provided to move the or each carrier, the cable being driven, for example, by drive means located at an end of the polytunnel.

Alternatively, the conveyor track member may be designed to allow a control member to be moved along the polytunnel, the control member being moveable, for example, to drive parts of the tunnel wall between vented and closed positions. Again, the control member may be arranged to be cable driven, and if desired the carrier member of a transportation system may be designed to also act as the control member.

In one embodiment of such an arrangement the tunnel system is provided with an elongate venting bar of flexible form, the venting bar being connected to a covering of the polytunnel, a runner being arranged to ride along the venting bar under the control of the control member. In use, the length of an adjustable link  
5 between the control member and the runner is selected and the runner is pulled through the tunnel by the control member to lift the flexible venting bar, and hence the covering, to provide a chosen degree of venting. A reduction in venting is achieved by pulling the runner through the tunnel to force the venting bar, and hence the covering, downwards, and this is achieved by lowering the point on the control  
10 member to which the link is connected.

Although two specific uses of the conveyor track member are mentioned above, it will be appreciated that a number of other operations may make use of the conveyor track member.

The invention will further be described, by way of example, with reference  
15 to the accompanying drawings, in which:

Figure 1 is a diagrammatic sectional view of a tunnel;

Figure 2 is a side view of the tunnel shown in Figure 1;

Figures 3, 4 and 5 are views illustrating parts of the tunnel of Figures 1 and 2;

and

Figure 6 is an enlarged view, illustrating part of a venting arrangement.

The polytunnel illustrated in the accompanying drawings is, for the most part, of conventional form comprising a number of leg members 10 arranged in two parallel rows, each leg member 10 of one of the rows being inter-connected with a  
5 corresponding leg member 10 of another of the rows by means of a hoop member 12. A polythene or other plastics material cover is stretched over the hoop members 12 and leg members 10 to form an enclosed tunnel forming a growing space within which crops may be cultivated. A wide range of crops may be grown in the polytunnel. As shown in Figure 1, an end frame 16 is formed to provide additional  
10 rigidity to the end of the polytunnel. The end frame is of the form described in the co-pending Patent Application No. 0210091.5. As shown in Figures 2 and 3, the end frame 16 supports a motor 18 of any suitable form, the motor 18 driving a pulley  
20.

In accordance with the invention, the hoop members 12 are inter-connected  
15 by a substantially rigid conveyor track member 22 which extends along substantially the full length of the polytunnel. The conveyor track member 22 is located beneath the peak of each hoop member 12 so as to minimise the obstruction to head room within the polytunnel, thereby minimising any obstruction to the movement of machinery through the tunnel.

The conveyor track member 22 includes flanges upon which the wheels 24 of a carrier member 26 can ride to permit the carrier member 26 to be transported along substantially the full length of the conveyor track member 22. It will be appreciated that the conveyor track member 22 is of relatively large length in order to extend along substantially the full length of the polytunnel. Clearly, it may therefore be desirable to construct the conveyor track member 22 in several parts which are inter-connected in an end-to-end fashion, in use. Where the conveyor track member 22 is made in several parts, the inter-connection between the various parts of the conveyor track member should be such as to permit the carrier member 26 to move freely between the various parts of the conveyor track member.

The carrier member 26 is connected to cables which extend along the length of the conveyor track member and around the pulley 20 and around another pulley located at the opposite end of the conveyor track member 22. It will be appreciated that with such an arrangement, rotation of the pulley 20 by the motor 18 causes movement of the cable to draw the carrier member 26 along the conveyor track member 22. The direction of movement of the carrier member 26 will depend upon the direction of rotary movement of the pulley 20.

Where the carrier member 26 is to be used as part of a system for use in the transportation of products or tools to or out of the polytunnel, then the carrier

member 26 may have, depending therefrom, a basket or tray arranged such that as the motor 18 drives the carrier member 26 along the conveyor track member 22, the tray or basket is moved through the polytunnel. Generally, the tray or basket will be suspended from the carrier member 26, thus it will be appreciated that the weight  
5 of the tray or basket and any products or tools carried thereon is supported by the conveyor track member 22. However arrangements may be possible in which the carrier member 26 is used to pull a wheeled or tracked vehicle along the polytunnel, for example for use in the transportation of products or tools into or out of the polytunnel.

10 Although the carrier member 26 may be used in the transportation of products or tools along the polytunnel, in the arrangement shown in the accompanying drawings the carrier member 26 is used as a control member for use in the operation of an automated venting system for the polytunnel. As shown in Figure 4, the carrier member 26 is connected to a rigid link bar 28 of adjustable length, the  
15 opposite end of which is connected to a runner device 30 which is slidable along a flexible venting bar 32 which extends substantially the full length of the polytunnel. The runner 30 is provided with a plurality of wheels adapted to ride along surfaces of the bar 32 such that the runner 30 is freely slidable along the bar 32.

As shown in Figure 6, each hoop member 12 carries a slidable grip member

40 to which the polythene or other material cover 14 is secured. Each grip member 40 is secured, for example by means of a wire link 42, to the bar 32. It will be appreciated, therefore, that raising or lowering of the bar 32 causes each grip member 40 to move along its respective hoop member 12 thereby raising or lowering  
5 the cover 14 to increase or reduce ventilation of the tunnel.

In use, if it is desired to increase the ventilation of a tunnel, the link bar 28 is shortened. The carrier member 26 is then drawn through the tunnel using the motor 18 in the usual manner. The action of drawing the carrier member 26 through the tunnel pulls the runner 30 through the tunnel, the runner 30 causing the flexible  
10 venting bar 32 to be lifted to a position determined by the length of the link bar 28. In the attached drawings, the polytunnel is shown with the carrier member 26 and runner 30 only part-way along the polytunnel with the result that venting has been increased in one part of the tunnel, but has not yet been increased elsewhere.

A plurality of ropes (not shown) are provided in a zig-zag configuration to  
15 hold the cover 14 in place. When the sides of the tunnel have been lifted, friction between the ropes and the cover 14 results in the cover 14 being held in the desired position once the passage of the runner 30 through the tunnel has been completed.

To lower the cover 14 to reduce ventilation, the point at which the link bar 28 is connected to the carrier member 26 is lowered and the carrier member 26 and



runner 30 drawn through the tunnel thereby forcing the vent bar 32 and cover 14 downwards.

Although in the description hereinbefore venting of only one side of the tunnel is adjusted, ventilation of the other side can be adjusted in the same manner  
5 either simultaneously with one another, or separately. Controlling the ventilation of both sides of the tunnel simultaneously is advantageous in that the side-acting forces on the carrier member 26 are balanced or substantially balanced.

CLAIMS

1. A polytunnel system comprising a plurality of polytunnel supports, and a track member interconnecting at least some of the supports.
2. A system according to Claim 1, wherein the track member is of substantially  
5 rigid form.
3. A system according to Claim 1 or Claim 2, wherein at least one of the supports comprises a pair of leg members and a hoop member supported by the leg members, the track member being carried by the hoop member.
4. A system according to any one of the preceding claims, further comprising  
10 a carrier member moveable along the track member and drive means for driving the carrier member.
5. A system according to Claim 4, wherein the drive means comprises a cable connected to the carrier member and co-operating with a motor driven pulley.
6. A system according to Claim 4 or Claim 5, further comprising load  
15 supporting means associated with the carrier member.
7. A system according to Claim 6, wherein the load supporting means comprises a basket or tray carried by the carrier member.
8. A system according to Claim 6, wherein the load supporting means comprises a vehicle connected to and arranged to be driven by the carrier member.

9. A system according to any of Claims 1 to 3, further comprising a control member arranged to be driven along the track member, and drive means for driving the control member.
10. A system according to Claim 9, wherein movement of the control member  
5 drives parts of a wall of the tunnel between raised and lowered positions.
11. A system according to Claim 10, further comprising an elongate venting bar of flexible form, the venting bar being connected to a covering of the polytunnel, a runner being arranged to ride along the venting bar under the control of the control member.
- 10 12. A system according to Claim 11, further comprising a link of adjustable length interconnecting the runner and the control member.
13. A polytunnel system substantially as hereinbefore described with reference to any of the accompanying drawings.

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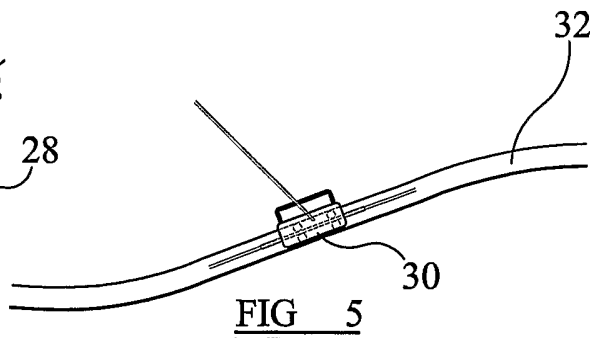
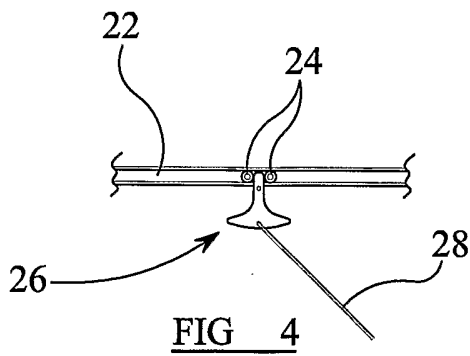
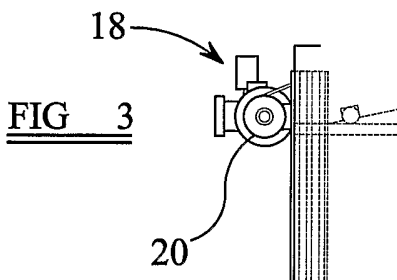
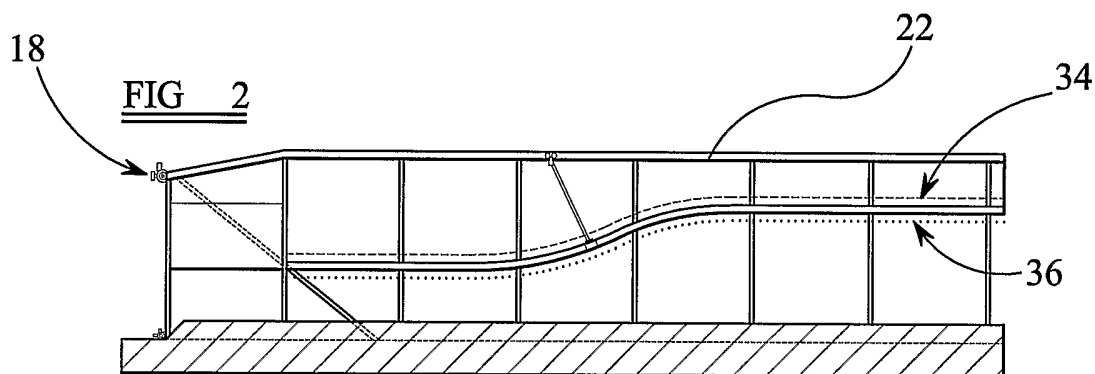
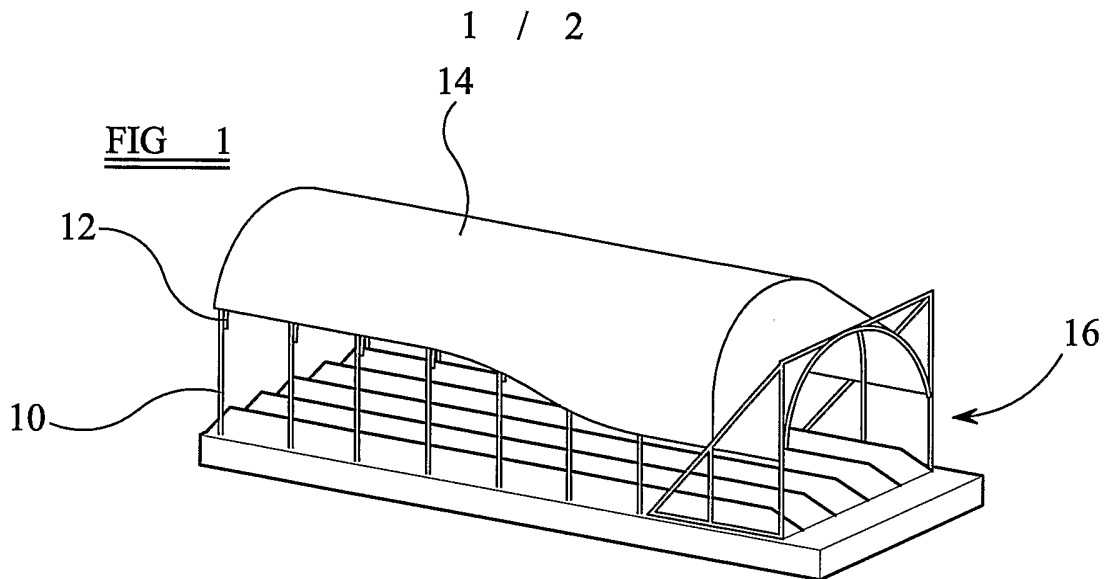
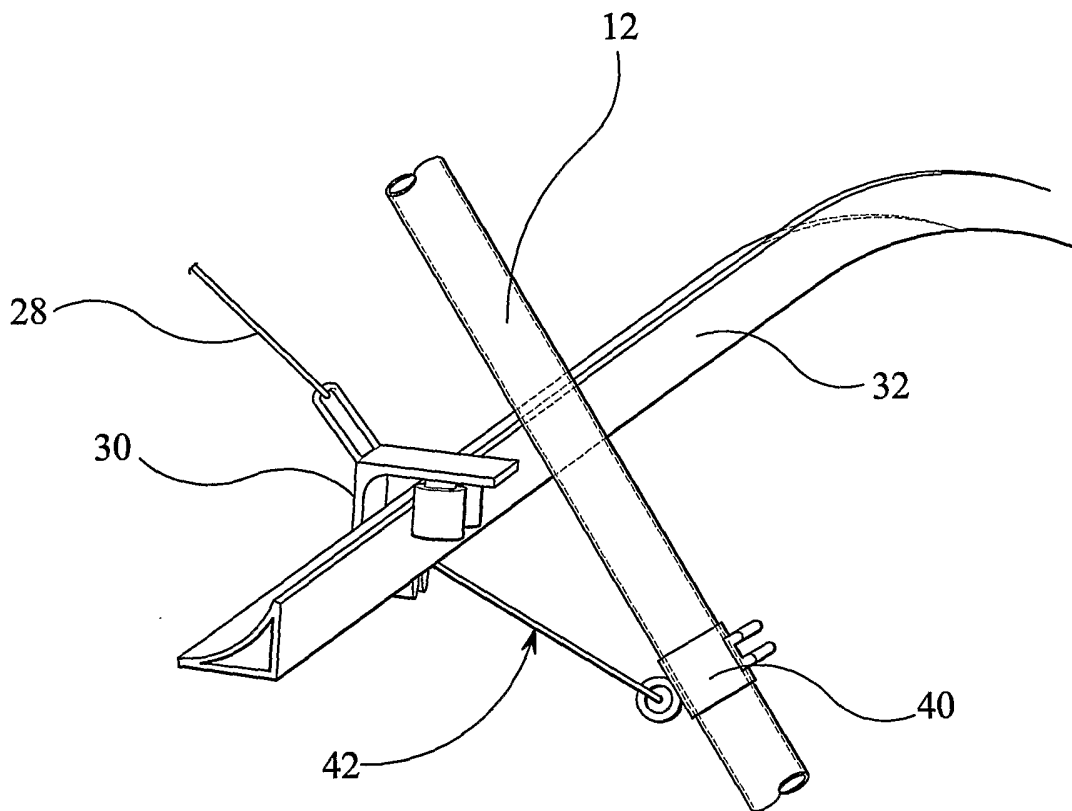


FIG 6



**INTERNATIONAL SEARCH REPORT**

International Application No

PCT/GB 03/04530

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 A01G9/14 A01G9/24

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 A01G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

18 February 2004

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## INTERNATIONAL SEARCH REPORT

International Application No

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