

(12) UK Patent Application (19) GB (11) 2 301 014 (13) A

(43) Date of A Publication 27.11.1996

(21) Application No 9510737.1

(22) Date of Filing 26.05.1995

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(51) INT CL<sup>6</sup>  
**A01G 27/00**

(52) UK CL (Edition O )  
**A1E EAE**

(56) Documents Cited  
**GB 2185374 A GB 0931612 A US 4336666 A**  
**US 4300309 A**

(58) Field of Search  
UK CL (Edition O ) **A1E EAE**  
INT CL<sup>6</sup> **A01G 27/00**  
**Online : WPI**

(54) Plant waterer

(57) A reservoir for containing water to water plants, particularly plants in hanging baskets. The reservoir has an enclosed, rigid-walled container 20 with an unrestricted water outlet 36 from the bottom of the container, a restricted air inlet 30 at the top of the container and means for supporting the container above a plant growing location. In use, water charged to the container can escape through the outlet 36 at a rate determined by the aperture size of the restricted air inlet, which ensures that a partial vacuum is maintained in the container above the water.

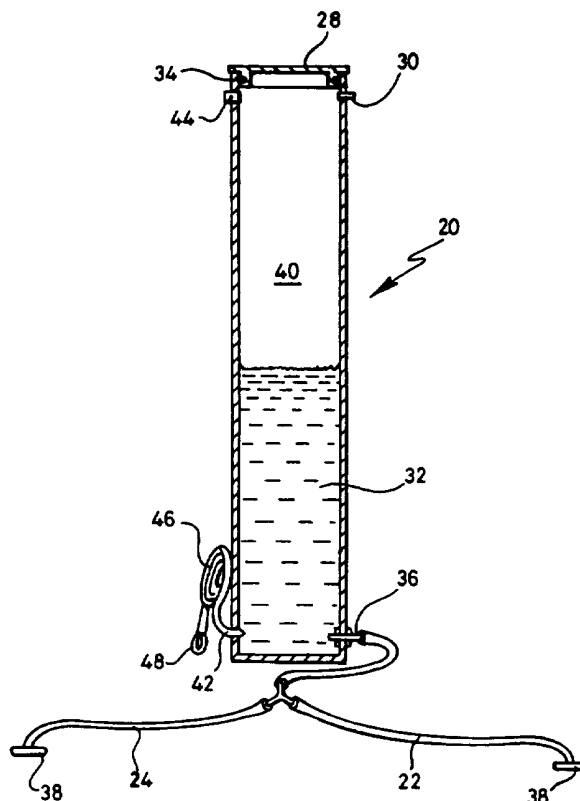


Fig. 2

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995

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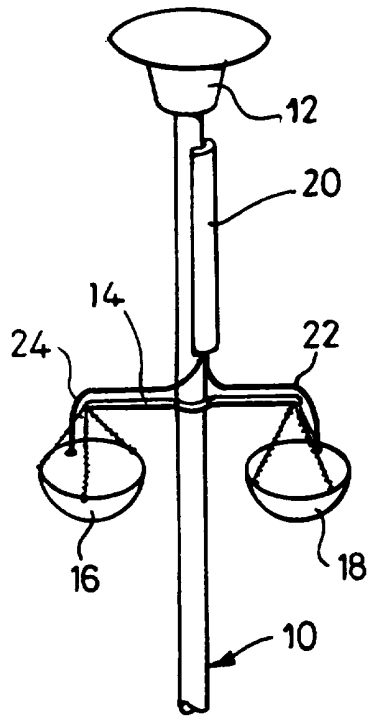


Fig. 1

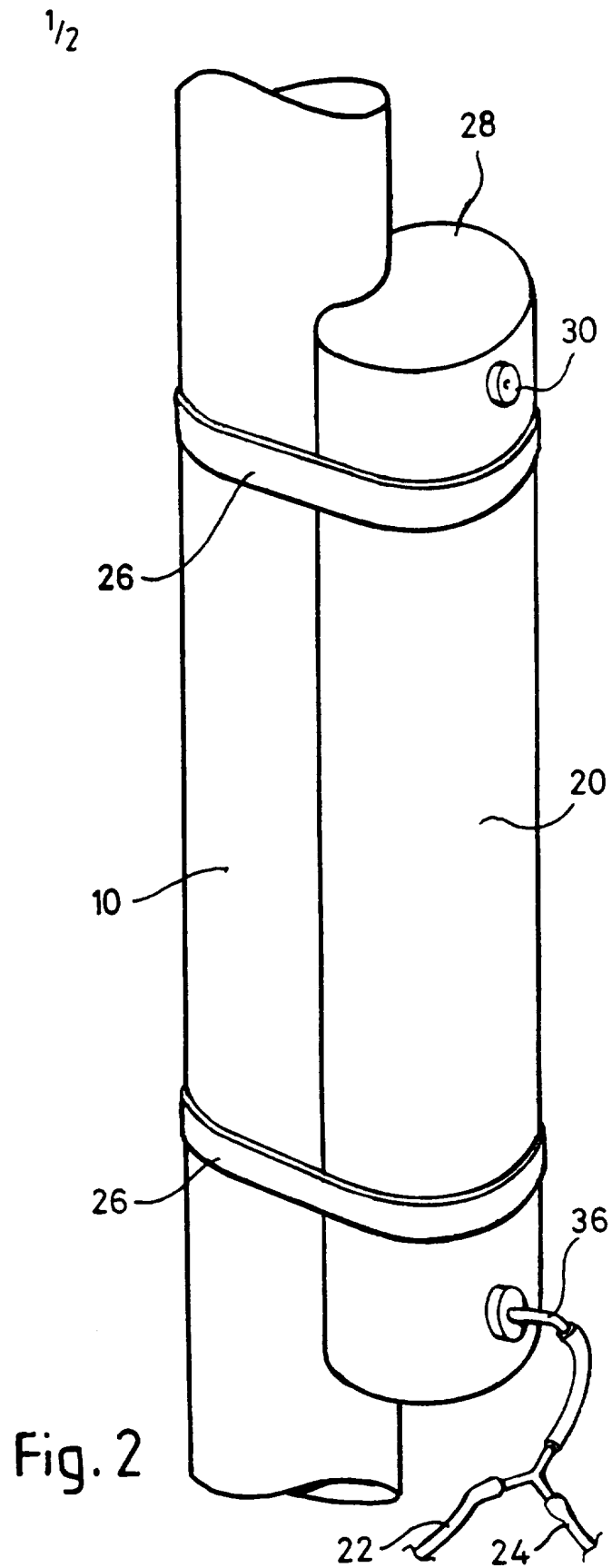


Fig. 2

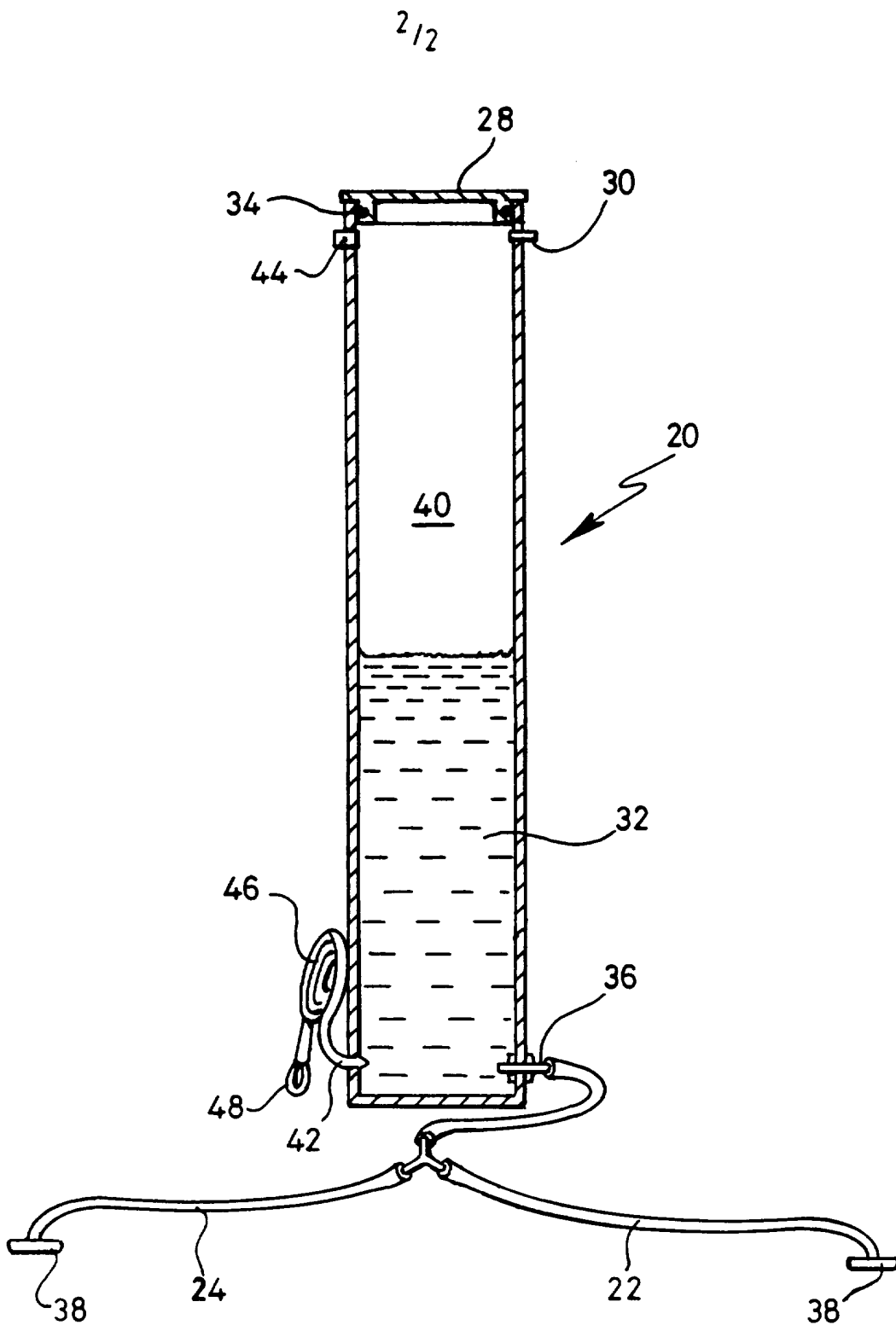


Fig. 2

## A RESERVOIR

This invention relates to a reservoir for containing water  
for watering plants, in particular for watering plants in  
5 hanging baskets.

Hanging baskets are very attractive ways of displaying  
growing flowers, but they require a great deal of  
maintenance, especially feeding and watering.

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Conventionally, baskets are suspended from brackets fixed  
at a high point, usually above eye level, in order to  
achieve the desired visual effect. It is then difficult  
to water the contents of the basket and to ensure that it  
15 is properly maintained.

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Towns and villages are often decorated with hanging  
baskets suspended from brackets on lamp posts or walls.  
Keeping these baskets properly watered throughout the  
growing season is a time-consuming and labour intensive  
20 operation.

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According to the invention, there is provided a reservoir  
for containing water to water plants, the reservoir  
25 comprising an enclosed, rigid-walled container, an  
unrestricted water outlet from the bottom of the  
container, a restricted air inlet at the top of the  
container and means for supporting the container above a  
plant growing location.

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By using such a reservoir, it is possible to fill it  
rapidly with a relatively large quantity of water, and  
then to control the outflow of water by restricting the  
rate at which air can enter the container so that a  
35 partial vacuum is formed in the chamber above the water.

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This partial vacuum then controls the rate at which water is dispensed. No restriction is needed in the water outlet which is advantageous because restrictions in water outlets are notoriously prone to blockage.

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There may be one, two or more water outlets from the bottom of the container. Each outlet is preferably associated with a length of tubing which will direct water to a plant growing location, normally a hanging basket suspended from a bracket beneath the reservoir.

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In a particularly preferred embodiment, the container is tall and thin so that it can be mounted on a vertical post without being obtrusive. For example, a suitable container can have a cross-sectional area of about 75 cm<sup>2</sup>, a height of about one metre and a capacity of about 7 litres. The container may have a cross-section shaped so as to fit snugly against a circular post.

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A long, thin container of this type can be supported by being strapped to a post, but alternatively the reservoir could be suspended from a suitable location above where the plants are growing, or can be supported on a shelf at a position above where the plants are growing.

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The air inlet is preferably adjustable to vary the rate of air entry and thereby to vary the rate at which water leaves the outlet.

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In order to refill the container, a sealed lid can be removed and the container can be filled by placing the end of a hose pipe in the container. When filling is complete, the sealed lid must be put back in place.

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Alternatively, the container can be filled through a water

inlet at the bottom of the reservoir, and in this case the reservoir will also include at the top a one-way valve which will allow the expulsion of air when the internal air pressure rises so that water can be pumped in from below to displace the air from the top of the container. However, once the water inlet is closed at the end of filling, then the outflow of water will once again be controlled by the air entering through the restrictive air inlet.

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In order to make it possible to refill the container from the ground, the container may have associated with it a length of retractable hose so that the end of the hose can be reached down from the ground, and pulled down to allow a water supply to be connected to it.

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The container walls must be sufficiently rigid not to collapse and not to flex significantly under the differential pressure resulting from atmospheric pressure acting on their outer surfaces and a sub-atmospheric pressure inside. Suitable materials are metal and rigid plastics, and the cross-sectional shape of the container may also contribute to the required rigidity.

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

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Figure 1 is a schematic view of the top of a lamp post from which two hanging baskets are suspended;

Figure 2 is a view on a larger scale of the reservoir from the installation of Figure 1; and

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Figure 3 is a cross-section through a reservoir

according to the invention.

Figure 1 shows the top of a lamp post 10 with a lamp at 12 and a two-armed bracket 14 for supporting hanging baskets 16 and 18. Such arrangements are well known. In Figure 1 the baskets 16 and 18 are shown unplanted, for ease of illustration.

Mounted on the upper part of the lamp post 10, above the bracket 14, is a reservoir, the main part of which is a water container 20. The container contains a volume of water which will be allowed to flow out, in a controlled fashion, through an outlet pipe 22 or 24 so that the water from the container drips into the basket 16 or 18. Preferably both pipes 22 and 24 will be connected simultaneously to the container.

The container 20 is shaped so that it is relatively visually unobtrusive. It can be painted a colour to match the colour of the post 10 and is long and thin so that it blends into the contour of the post. This configuration is shown in more detail in Figure 2, where it will be seen that the container 20 has, in cross-section, a kidney bean shape so that the container can be placed snugly against a circular post 10. As shown, the container is held in place by tension bands 26, although it may be necessary to provide additional support for the container to ensure that it does not slip down the post when it is full with water and therefore at its maximum weight.

The container has a closed top at 28 and a restricted air inlet at 30.

The way in which this container operates will now be described with reference to Figure 3.

In Figure 3, the container 20 is shown in section, partly filled with water at 32 and with the internal space closed by a removable lid 28 which is sealed to the container walls through an O-ring seal 34. A removable lid 28 is required when the container is to be filled through this lid, but if the container is set up to be filled from below, then the top of the container can be permanently sealed.

If required, on/off valves can be placed in the pipes 22, 24 so that the pipes can be closed off during maintenance. Normally these valves will be left open during filling, so that full flow of water through the pipes will flush out any debris.

An air inlet valve 30 is positioned as close as possible to the top of the container and has a very narrow passage through which air can be drawn in. The valve can for example be a needle valve so that it can be adjusted to give a very small opening.

Near the bottom of the container, at one side is an outlet opening 36 made up of an open stub pipe, positioned about 10 mm from the container base, which extends a short distance into the container 20 and which provides unobstructed access for the water into the outlet pipes 22, 24. The outlet opening could alternatively be in the base of the container. The pipes can be flexible hoses. Each of the pipes has a spray nozzle or rose 38 at the end so that the water is dispensed onto the growing plants over as wide an area as possible.

In use, with the container in the condition shown in Figure 3, water 32 flows out of the outlet 36 and along the hoses 22 and 24 under the influence of gravity.



However, the gravitational force is resisted by a sub-atmospheric pressure created in the air space 40 of the container. To allow the water 32 to flow out, air must be drawn in to the space 40 through the restricted air inlet 30, and it is the rate at which air is able to enter through the inlet 30 which determines the rate at which water will flow along the pipes 22, 24. Because the air inlet 30 only has air flowing through it and never has water flowing through it, it is unlikely to corrode or become blocked over time. By placing the air inlet on the side of the container rather than on the top, it is unlikely to become obstructed by falling leaves or anything else.

It has been found experimentally that if the container contains about 8 litres of water, then this water can be released to the plants over a period of about 40 hours, but the rate of release can be adjusted by controlling the inlet valve 30 to give any desired watering rate.

As an alternative to filling the container by lifting the lid 28 and placing a hose in at the top, the container may be filled using a pressurised water source connected to a water inlet 42. If water is pumped into the container from below, then air has to be expelled from the air space 40 as the container is filled, and this takes place through a non-return valve 44 which will open automatically when the pressure in the air space 40 rises above atmospheric pressure and will close automatically when the pressure in the space 40 drops, and will thus remain closed during all other working conditions. A subsidiary advantage of this filling method is that air will be forced from inside outwards through the air vent 30, thus clearing it of any foreign matter, while the container is being refilled.

Because it is envisaged that the container 20 will be secured at a high level, eg on a post or on a wall but in all cases above the position where the plants to be watered are located, it will be convenient to provide a method whereby the container can be filled from ground level. It is possible to connect to the water inlet 42 a coiled hose 46, one end of which has a loop 48 with the coiled hose being associated with a spring retraction mechanism. The operator, using a hook on the end of a pole, can reach up and engage the hook on the end of his pole with the loop 48 to pull the hose, against its retraction spring, down to ground level where the free end of the hose can be connected to a pressurised water source. The water can then flow up the hose 46 through the inlet 42 and into the tank 20 and the operator will know when the tank is full when water starts to flow out of the non return valve 44. The operator can then fit a plug to the end of the hose 46 and release it whereupon it will retract up to a position alongside the container 20, where it will be effectively out of sight.

In a further development, it may be possible to make the water outlet pipes 22, 24 as rigid pipes and these pipes may themselves form the brackets or parts of the brackets which will support the hanging baskets 16, 18. Thus the container 20 with its outlet pipes may form a complete system for supporting and watering hanging baskets.

The invention is not restricted to a tall, thin container 20 as shown. The same principle can be used, for example, for continuous watering of plant tubs placed at ground level, and the tank in this case may be a thin, flat container placed against a wall.

It will be seen that the reservoirs described here provide

a low-maintenance but highly effective way of providing continuous watering of plants at any desired watering rate without requiring constant attendance.

Claims

1. A reservoir for containing water to water plants, the reservoir comprising an enclosed, rigid-walled container, an unrestricted water outlet from the bottom of the container, a restricted air inlet at the top of the container and means for supporting the container above a plant growing location.
2. A reservoir as claimed in Claim 1, with at least two water outlets from the bottom of the container.
3. A reservoir as claimed in Claim 1 or Claim 2, wherein the or each outlet is associated with a length of tubing which will direct water to a plant growing location.
4. A reservoir as claimed in any preceding claim, wherein the container is tall and thin so that it can be mounted on a vertical post without being obtrusive.
5. A reservoir as claimed in Claim 4, wherein the container has a cross-sectional area of about 75 cm<sup>2</sup>, a height of about one metre and a capacity of about 7 litres.
6. A reservoir as claimed in Claim 4 or Claim 5, wherein the container has a cross-section shaped so as to fit snugly against a circular post.
7. A reservoir as claimed in any preceding claim, wherein the air inlet is adjustable to vary the rate of air entry and thereby to vary the rate at which water leaves the outlet.
8. A reservoir as claimed in any preceding claim,

wherein the container has a removable sealed lid.

5 9. A reservoir as claimed in any preceding claim, wherein the reservoir has a water inlet at the bottom and a one-way valve at the top to allow the expulsion of air when the internal air pressure rises so that water can be pumped in from below to displace the air from the top of the container.

10 10. A reservoir as claimed in any preceding claim, wherein the container has associated with it a length of retractable hose so that the end of the hose can be pulled down to below the container to allow a water supply to be connected to it.

15 11. A reservoir as claimed in the container walls are of metal.

20 12. A reservoir as claimed in any preceding claim, wherein the cross-sectional shape of the container is designed to contribute to the rigidity in resisting deformation of the container induced by differential pressure across the container walls.

25 13. A reservoir substantially as herein described with reference to the accompanying drawings.



Application No: GB 9510737.1  
Claims searched: 1 to 13

Examiner: Paul Makin  
Date of search: 9 July 1996

**Patents Act 1977  
Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.O): A1E (EAE)  
Int Cl (Ed.6): A01G 27/00  
Other: Online : WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2185374 A (SY) Whole document	1,2,7,8
X	GB 931612 (KAISER) See particularly Figure 1	1,4,7,12
X	US 4336666 (CASO) Whole document	1,2,3,7,8
X	US 4300309 (MINCY) Whole document	1,3,7,8,11

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.