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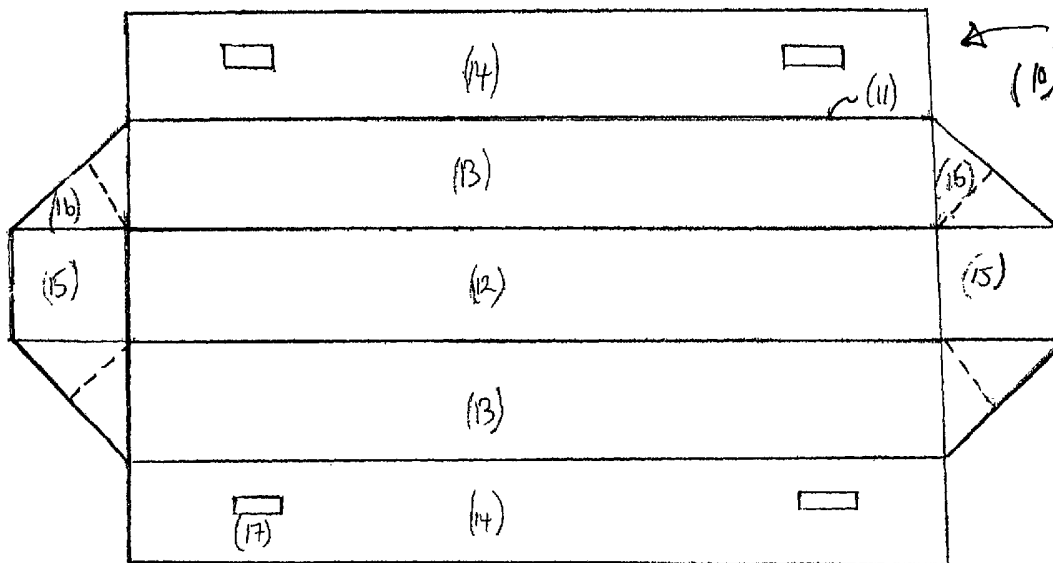
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(54) Title: SUPPORT DEVICE



(57) Abstract: The present invention relates to a method for planting plants and a support for supporting a plurality of plants. In particular, but not exclusively, the invention relates to a method and apparatus for growing plants at one location and then transporting semi-mature or mature plants to a new location.

SUPPORT DEVICE

The present invention relates to a method for planting
5 plants and a support for supporting a plurality of
plants. In particular, but not exclusively, the
invention relates to a method and apparatus for growing
plants at one location and then transporting semi-mature
or mature plants to a new location.

10 There is a requirement within disciplines such as
horticulture, silviculture and agriculture to provide
sites such as fields, gardens and display areas with a
range of vegetation types at varying degrees of maturity.

15 One option is to plant seeds or seedlings at the required
site and maintain the plants there during their growth
period, after which time they can be further maintained,
for instance by pruning, at the required level of
20 maturity. However, this option has a number of inherent
problems, significantly that it requires a great deal of
forward planning. For example, a perimeter hedge would
need to be planned several years in advance, the site
initially prepared and the plants maintained during their
25 growing phase, with associated financial and man-power
implications.

An alternative option is to import vegetation of the
required maturity to the site. In the case of providing
30 a display of annuals, the plants may be grown at a
nursery and individually imported to the site in plant
pots. For a temporary display the plants may be retained
in the plant pots and removed from the site comparatively
easily. Alternatively, following a certain degree of

preparation of the site, which will be dependent on the number of plants constituting the display, the annuals may be planted within the ground to provide a more permanent display. To the other extreme, if an
5 individual wishes to plant a perimeter hedge around a site, whilst it would be possible to import individual plants of the required level of maturity, the time to arrange the plants for either a temporary or permanent display would be far more costly, in terms of both time
10 and money. Furthermore, the disruption of the root ball that is associated with the removal a larger species from a plant pot may significantly effect the growth period of the plant.

15 There is therefore a problem of being able to provide a display of vegetation, that requires minimal preparation of the site, which can be performed at any point in the growth phase of the plant, which can be either temporary or permanent and which results in minimal disruption to
20 the structure of the plant.

Mature plants may also be useful for reasons other than aesthetic display. For example, rows of hedges or trees may be used to hold together sand, soil or earth in an
25 exposed region such as an embankment. Waiting for rows of trees to mature or replanting mature plants is prone to the above-referenced problems.

It is an aim of the embodiments of the present invention
30 to at least partly mitigate the above-referenced problems.

According to a first aspect of the present invention there is provided a support apparatus for supporting a plurality of plants comprising:

5 a body portion, constructed from a bio-degradable material, having an inner region in which a growing medium, in which roots of said plants can grow, is containable; and

10 a plurality in engaging means, for engaging with lifting means, for enabling said support structure to be located at a new location subsequent to the completion of plants at a further location of at least a seedling stage of development of said plants.

According to a second aspect of the present invention there is provided a method for planting plants comprising the steps of :

planting said plants at a pre-mature stage of development in growing medium contained in an inner region of a biodegradable support;

20 subsequent to the completion of at least a seedling stage of development, at a first location, engaging lifting means with engaging means of said support;

lifting said support from said first location; and

25 transporting said support apparatus together with the plants growing therein, to a new location.

Embodiments of the present invention will now be described hereinafter, by way of example only, with reference to the accompanying drawings in which;

30

Fig. 1 shows an unfolded plan view of a rectangular support apparatus for use in supporting a plurality of plants.

Fig. 2 shows a schematic view of a bag lifting pole.

5 Fig. 3 shows an example of the mesh used to make the container.

Fig. 4 shows a schematic view of a bag lifting frame.

Fig. 5 shows a schematic view of a circular container for use in a circular vegetative display.

10

In the drawings like reference numbers refer to like parts.

Fig 1 shows an unfolded plan view of a rectangular support apparatus 10. The support apparatus can however be of any shape to fit the desired location including round, square, diamond, triangular, arcuate and cubic. Whilst a rectangular support apparatus will preferably be used for planting hedgerows around perimeters of land, a circular support apparatus lends itself more to a central floral feature on a roundabout. It can also be envisaged that rectangular strips of turf could be easily transported to sites within this support apparatus where grass surfaces, such as football pitches, tennis courts and bowling greens are required. In this later situation this would prevent the turf being damaged when it is removed from its place of growth, the potential for it to dry out whilst being transported and provides a far less laborious method of laying the turf.

30

The fact that the support apparatus is preferably made of a flexible mesh means that the possibilities in respect

to design are almost unlimited. It is possible to imagine a bespoke design service being available, with the requirements of the site defining the parameters of the apparatus. Furthermore, the apparatus does not need
5 to be limited to one height, but a design of several layers could be possible. As shown in figure 1 the rectangular support apparatus, which is preferably greater than 1.5 metres in length and may be up to 10 metres in length, may comprise five equally sized
10 rectangular panels. When the apparatus is folded along the fold lines 11 and is ready for use, the central panel 12 forms the base and the two panels 13 either side of the central panel form the sides. The end of the apparatus is formed from an end panel which consists of a
15 square section 15 on either side of the central panel 13 and two triangular sections 16 on either side of the two side panels 13. Preferably the external edges of the two outermost panels 14 are stitched, glued, or fastened by a range of other more reversible fastening means (e.g hooks
20 and eyes, zips, buckles) to the side panels 13 so that the underneath sides of panels 13 and 14 are in contact, and therefore form a sleeve, referred to hereafter as the engaging means. Poles may be inserted along the length of this sleeve to provide a rigid lifting means whilst
25 also helping to retain the shape of the apparatus and its contents during lifting.

As shown in figure 1 the outermost panels 14 are provided with small holes at appropriate distances along the
30 sleeve in order that areas of the poles are exposed and thus can be grasped by hand or attached to lifting machinery, via for instance hooks. It will be understood

that the support will preferably be made from any rotatable/biodegradable material, this is particularly advantageous in overcoming the potential environmental problems, such as toxicity and long-term waste associated with the use of plastics, such as polystyrene. The support apparatus may be formed from a single piece of material or be formed from multiple parts, and in the later case the multiple parts may be made from the same or different materials.

10

Fig 2 shows an example of the lifting means for the support apparatus. The lifting means shown is designed for a rectangular support apparatus and may be in the form of a rigid or semi-flexible pole 21. The pole may be telescopic or made from multiple parts, which may screw together or snap-fit with each other and which when in use extends at least substantially along the length of the support apparatus. The pole can be manufactured from high tensile strength materials, such as metals (e.g stainless steel) or plastics. The poles need to be strong enough to support the weight of the apparatus when it is filled with growing medium and plants. On a rectangular support apparatus a pole can be inserted into sleeves on either side of the apparatus and lugs 22 are provided in order to aid in the retention of the pole within the sleeve. Other alternative engagement means may be provided, with the options being very much dependent on the size of the support apparatus and the types of plants grown therein. For small containers of about 1 meter in length, into which plants of a limited height have been planted, it may be sufficient to provide on the side panels 13 a plurality of hoops, handles,

30

rings or other gripping means, which may be grasped by hand or alternatively into which poles, ropes, straps or chains can be threaded either along the length of the apparatus or across the apparatus prior to lifting by hand or machinery. These gripping means may be integral with the support apparatus and thus manufactured from the same material or they may be attached by a range of means, such as gluing or stitching or by more reversible fastening means (e.g hooks and eyes, zips, buckles), and may be made of different materials, such as rope or plastics. An alternative is to provide straps having loops at each end running under the base of the support.

Fig. 3 shows an example of the type of material that the support apparatus can be manufactured from. A range of materials may be used and will be obvious to those skilled in the art, but preferably the material is natural and biodegradable, for example sisal or hessian. The material is in the form of a woven or non-woven mesh, in which the holes are sufficiently small to prevent the growth medium, such as compost, from falling out whilst being sufficiently large enough to allow roots to spread outside of the apparatus. The selection of a suitable material as a result of its inherent properties will be very much dependent on the particular use to which the support apparatus will be put and the growth period of the plants it is to support. If the plant has tap roots the support will need to be deeper than for a plant having clump roots. If the apparatus is being provided to support the growth of a display of annuals from seed and then to further support the display during transport within the year to a number of locations, a specific requirement is for the apparatus not to degrade within

this year, but the actual tensile strength of the material may not be as an important consideration. In comparison, if the support apparatus is being used to provide support during the growth of a hedge, it would be desirable for the material not to degrade for a more extended period, such as 5 years and for the material to have a higher tensile strength, as the loads that it will be support whilst the apparatus is being lifted from site to site will be far greater. It can be envisaged that the fibres of the material may consist of homogenous or heterogeneous filaments of natural or synthetic materials.

Fig. 4 shows a schematic view of a bag lifting frame 41 which can be attached to a vehicle 42 capable of lifting the support apparatus, such as a crane. The frame 41 has a variable number of chains 43 attached to its under side, dependent on the size of load to be lifted. The chains can be of variable length and are preferably manufactured from metals, such as stainless steel. The chains are provided with hooks 44 at their ends which attach to the poles 21 and allow the apparatus to be transported securely to the desired location.

Fig. 5 shows a schematic view of an example of a location where the support apparatus containing plants may be sited, such as a roundabout 51. The support apparatus can be designed from flexible, high tensile strength material to fit into a site of varying shapes such as circular 52 or be in the form of an arcuate box 53. The support apparatus 54 has been designed to fit into the circular site 52 and the external surface of side panels 13 are shown, with the poles 21 being

inserted into the sleeves provided by the side panels 13 and outermost panels 14.

The support apparatus described above may be used as a
5 support during the growth period and transport of one or
a plurality of plants without effecting the growth period
of the plants, specifically by damage to the root
structure. The support apparatus can be adapted for a
range of plant species, ages and sizes and can be
10 designed with particular functions in mind, whether this
is to provide a floral display, to easily provide turf or
for providing a hedgerow. An initial step is to plant a
seed or seedling or even a mature plant into an
appropriate container, bearing in mind the size of the
15 mature plants and the end result required. The container
would contain a mixture of growing medium, preferably
recycled soft waste material present as a mulch and mixed
with a suitable percentage of waste soil for example,
sugarbeet soil. Alternatively the growing medium may be
20 topsoil or peat. The plants will be maintained during
their growth to a specified level of maturity by methods
that will be obvious to those skilled in the art,
including watering, feeding, protecting from pathogen
attack with the selective use of insecticides,
25 pesticides, biocides and fungicides and judicious
pruning. A new location will be identified and prepared
in readiness for the transport of the support apparatus
containing the plants. If the site is for a temporary
display of floral plants, for example in an office
30 reception area, minimal preparation of the area will be
required, as the plants will in all possibility remain in
the support apparatus whilst on display. In this case
the apparatus may need to be covered/ wrapped in a

waterproof material in order that the plants can still be watered without damaging the site.

Also the support structure may, in such a case, be
5 constructed from a non biodegradable material. In
comparison, if the site is a field and the support
apparatus is to provide a hedge around the perimeter of
the field, more preparation will be required. This will
include digging a trench for the hedge of the same size
10 as the support apparatus and possibly preparing the soil
on the bottom and sides in this trench. Once the new
location has been prepared, the support apparatus can be
transported to it. This will involve introducing lifting
means, for example a pole into an engaging means, for
15 example a sleeve on the support bag. The support
apparatus can then be transported to the new location,
depending on size this may be by hand, involving one or
several people, keeping the supporting apparatus upright
with as little disruption to the surrounding soil/mulch
20 as possible. For larger versions of the apparatus a
crane or alternative lifting means such as a winch can be
used to lift the apparatus onto a suitable mode of
transport, examples of which include a trolley, trailer
or lorry. The apparatus can be transported to the new
25 location by road, rail or air dependent on the distance
to the contracted site, because ordinary plant
requirements such as water can be easily rendered to the
plant due to the surface of the display being readily
accessible. Once the apparatus has reached the
30 contracted site it can be lowered in to the prepared
site, the engaging means such as the poles removed from
the sleeves and returned back to the supplier/grower and

the sleeves reversibly removed if desired. The apparatus can stay in the site temporarily or indefinitely as required, where it will degrade in situ over time.

5 Embodiments of the present invention provide for horticultural, silvicultural and agricultural plants to be maintained at a first location until a selected chosen level of maturity is reached and thereafter these plants may be transferred either singly or in multiples to
10 another site without interruption to their growth. A flexible receptacle for the containment of the root systems of trees, plants, shrubs, grasses, vegetables and fruits may be provided without limitation to their root system or growth. The container may be made of any
15 polymeric, metal or natural material of any length breadth or shape.

It will be understood that according to embodiments of the present invention the support bag will be lifted
20 vertically so as not to disturb the surrounding soil, mulch, roots and foliage. This lifting process may be carried out by a device suitable to be fixed onto the back hoe of a mechanical lifting vehicle.

25 According to certain embodiments of the present invention the support bag may be of any size so as to be capable of carrying an individual plant for say a windowsill up to a bag capable of containing the roots of a tree of trees. The support bag being the receptacle and container of the
30 roots of the plant or plants does not restrict, by virtue of its mesh construction, the roots of the plants as does a plant pot or solid sided container.

According to certain embodiments of the present invention the grower and the purchaser could agree to return to the grower the spoil from the newly excavated site thus
5 allowing that soil to be adequately sterilised for reuse in another support bag.

Certain embodiments of the present invention provide a flexible various shaped bag capable of holding plants,
10 trees, shrubs or any growing vegetation or coral.

Certain embodiments of the present invention provide a bag made of netting i.e. plastic or natural or mess made of wire, wood, rope, sisal, hessian, metal, fabric,
15 fibreglass, rubber or any other material of synthetic or natural substance. Some embodiments of the present invention provide a support bag which is made rigid and sufficiently strong to be lifted from the place of growing on its upper surface. It is made rigid by the
20 insertion of sufficiently strong, shaped to suit the bag, poles which can be slid into sleeves incorporated into the top surface of the bag. These poles may have cleats to allow carrier chains to fix position on the reinforced lifting areas of the bag.

25

Certain embodiments of the present invention provide a support bag which may have two or more tunnels or sleeves for the poles which may themselves be telescopic straight or curved and which may be inserted into the sleeve to
30 lift the bag. The tunnels or sleeves may be round or square or elliptical or shaped to suit the lifting pole or the shape may be determined because of design factors

such as shape or weight of the growing plants and growing medium in the support bag.

Certain Embodiments of the present invention provide for
5 the transport of support bags prior to the growing period
and after the final lifting procedure would be via
suitably designed and constructed vehicles, ramps, flat
beds and containers capable of carrying the bags in the
air, on the sea or over land. Certain embodiments of the
10 present invention provide small hand held bags which may
be designed to have their own inserted handles of wood,
plastic or other man made or natural substance so as to
be suitable for hand held carrying and personal
transport.

15
Certain embodiments of the present invention provide
support bags which are flexible receptacles for the
planting and growing of trees, shrubs, plants, fruits,
vegetables, hedging (deciduous and non-deciduous
20 varieties) parental and all other flower, seedling or all
varieties, vines, corals and all of the plant life
required to grow and then move with undisturbed rooting.

Certain embodiments of the present invention provide a
25 support bag which may be filled with a suitable growing
medium made up of, for instance, a mixture of a mulch
made up of soft land fill waste suitably dressed and a
waste soil possible sugarbeet. Alternatively compost or
other growing medium may be used.

30
Certain embodiments of the present invention provide a
support bag which is very convenient for the transference

of mature gardens in the event of a need to create, as is presently fashionable, city roof gardens, shrubbery's etc.

- 5 Certain embodiments of the present invention provide for all types of hedging to be grown at any level of maturity for use in environmental circumstances such as providing attractive screens within new housing estates, immediately creating a mature garden, agricultural
10 hedging replacement, climatic requirements in places where there is difficulty in growing trees from small saplings or whips.

- According to certain embodiments of the present invention
15 support bags could be planted with mature grasses or creeping plants which may be placed in suitable drop sites to allow the spread over the surrounding area of the desired species which would be advantageous in sites with climatic plant growth challenges, for example in
20 desert areas. Mature tree plantings may also be used in such places.

- Certain embodiments of the present invention provide a support bag that is buried in the ground and which has
25 the capacity to allow water (or any other required liquid, to flow both in and out of its material construction.

- Certain embodiments of the present invention provide a
30 support bag that will retain its strength up to the desired time of its useful life. For example ten years for hedging, longer for tree planting, the method of

controlling the desired time span being the type of substance used in the production of the mesh.

Certain embodiments of the present invention provide
5 that, dependent upon the life span requirement, six months for an annual flower display, the mesh may be made of a hessian or sisal mesh, the bag would then eventually degrade non-toxically into the surrounding area. The mesh can be made to, as it degrades, provide a long
10 acting fertiliser, pesticide or fungicide to support the plant as it grows on.

Certain embodiments of the present invention provide a bag which will allow the roots of the growing plants
15 contained with there within to spread in their natural manner unhindered by the mesh.

Certain embodiments of the present invention provide support bags which are suitably sized to accommodate
20 sufficient growing medium to allow the roots of the plants to grow up to the required maturity without growing through the mesh thus causing difficulties lifting the bag when the plants reach the level of maturity required.

25

Certain embodiments of the present invention provide a support bag of any shape or size which is designed to accommodate lifting poles which are themselves designed for that bag. In this way a kit of parts is provided.

30

Certain embodiments of the present invention provide a support bag which is designed to best accommodate any

type of previously mention plant whereby the lengths, depths and widths of the support bag may be from a few centimetres to tens of metres.

- 5 Embodiments of the present invention have been described hereinabove. However, it will be understood that by those skilled in the art that modifications may be made to those examples specifically described above without departing from the scope of the present invention.

10.

CLAIMS:

1. A support apparatus for supporting a plurality of plants comprising:
 - 5 a body portion, constructed from a bio-degradable material, having an inner region in which a growing medium, in which roots of said plants can grow, is containable; and
 - 10 a plurality in engaging means, for engaging with lifting means, for enabling said support structure to be located at a new location subsequent to the completion plants at a further location of at least a seedling stage of development of said plants.
- 15 2. The apparatus as claimed in claim 1 wherein said engaging means comprises a plurality of sleeves, or hoops, secured to said body portion in which a plurality of lifting means are insertable during a step of locating said support apparatus at said new
20 location.
3. The apparatus as claimed in claim 1 wherein said engaging means comprises a plurality of holes arranged in a side wall of said body portion, in
25 which a plurality of lifting means are insertable during a step of locating said support structure at said new location.
- 30 4. The apparatus as claimed in claim 2 or claim 3 wherein said lifting means comprises a plurality of rigid poles which extend at least substantially

along the length of said body portion of said apparatus when said apparatus is located at said new location.

- 5 5. The apparatus as claimed in any preceding claim wherein, when growing medium is disposed in the inner region of said support structure, said body portion adopts a substantially rectangular box like shape in which the length is greater than two
10 meters.
6. The apparatus as claimed in any one of claims 1 to 4 wherein in, when growing medium is disposed in the
15 inner region of said support structure, said body portion adopts a substantially arcuate box like shape, the longest arc of said having a length greater than two meters.
- 20 7. A method for planting plants comprising the steps of
 :
 planting said plants at a pre-mature stage of development in growing medium contained in an inner region of a biodegradable support;
25 subsequent to the completion of at least a seedling stage of development, at a first location, engaging lifting means with engaging means of said support;
 lifting said support from said first location; and
 transporting said support apparatus together with
30 the plants growing therein, to a new location.

8. The method as claimed in claim 7 further comprising the steps of:
selecting said new location by determining where said plants are to be located in a mature stage of development.
- 5
9. The method as claimed in any one of claims 7 or 8 further comprising the steps of :
selecting said biodegradable material whereby said material degrades prior to the growth of the roots of said plants, during a mature stage of development, being inhibited.
- 10
10. The method as claimed in any one of claims 7 to 9 wherein said step of engaging lifting means with engaging means comprises engaging lifting means with a plurality of sleeves or hoops, secured to a body portion of said support.
- 15
- 20 11. The method as claimed in any one of claims 7 to 9 wherein said step of engaging lifting means with engaging means comprises engaging lifting means with a plurality of holes pre-formed in a body portion of said support.
- 25
12. The method as claimed in any one of claims 7 to 11 further comprising the steps of inserting a plurality of rigid lifting poles into said engaging means.
- 30

13. The method as claimed in any one of claims 7 to 12
further comprising the steps of:
securing a support frame to said lifting means; and
lifting said support via a crane arranged to lift
said support frame.

5

14. The method as claimed in any one of claims 1 to 13
further comprising the steps of: providing a hole at
said location and subsequent step of transporting
said support to said new location, locating said
support in said hole; and thereafter growing said
plants at the new locations.

10

15. The method as claimed in any one of claims 7 to 13
further comprising the steps of:
subsequent to said step of transporting said support
to said new location, removing said support from
said new location via the steps of engaging lifting
means with said engaging means, lifting said
portable support structure and transporting said
support structure away from said new location.

15

20

16. A apparatus constructed and arranged substantially
as herein before described with reference to the
accompanying drawings.

25

17. A method substantially as herein before described
with reference to the accompanying drawings.

30

Fig. 1.

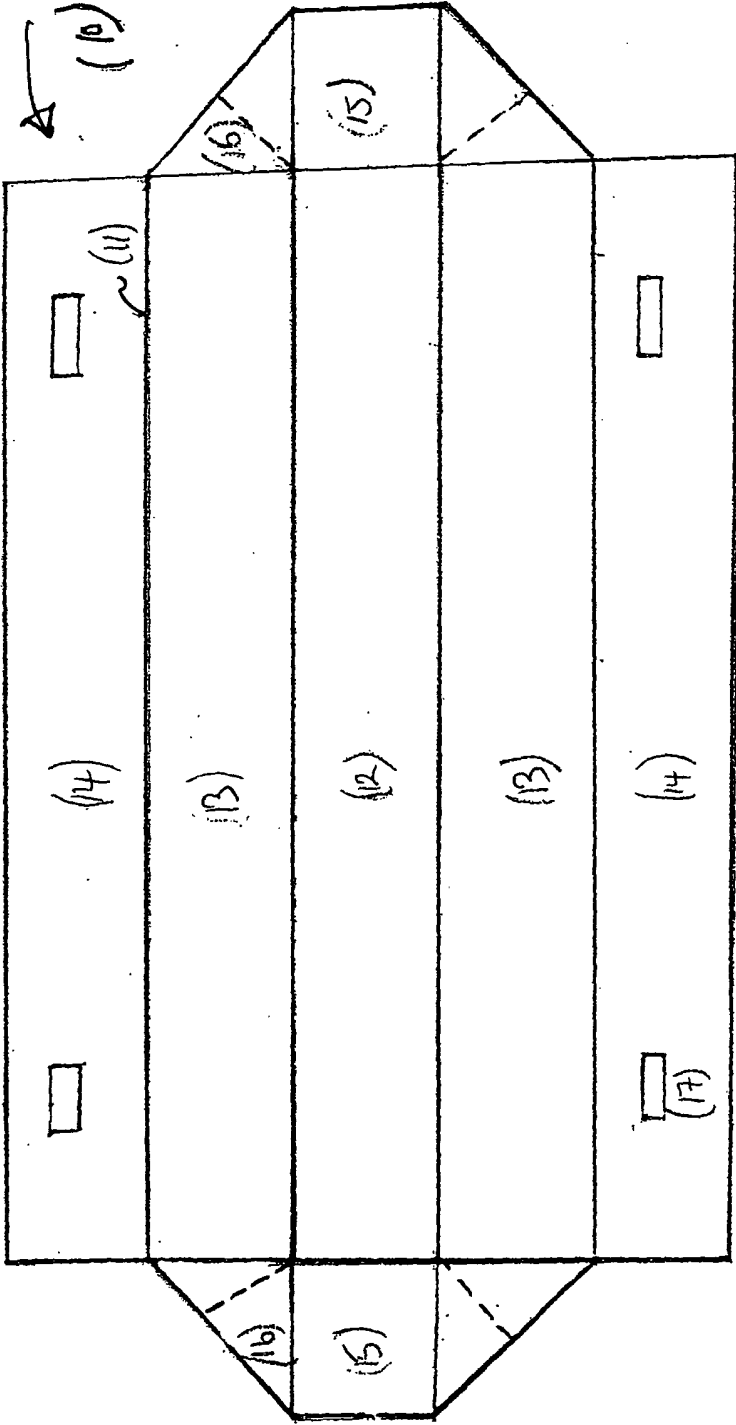


Fig 2.

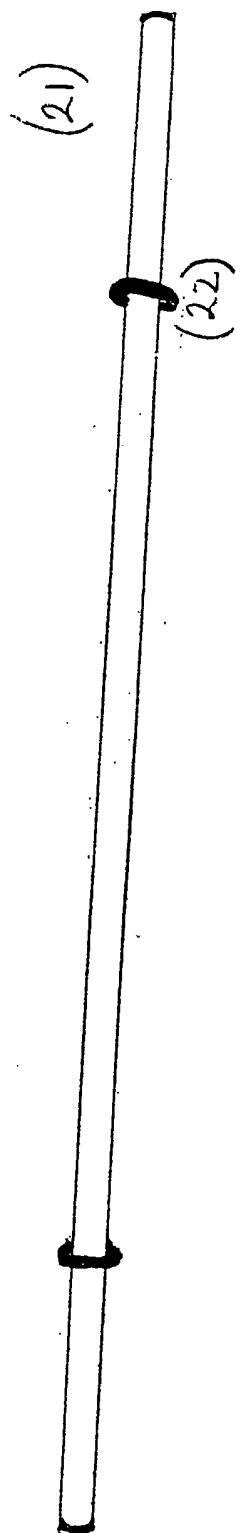


Fig 3.

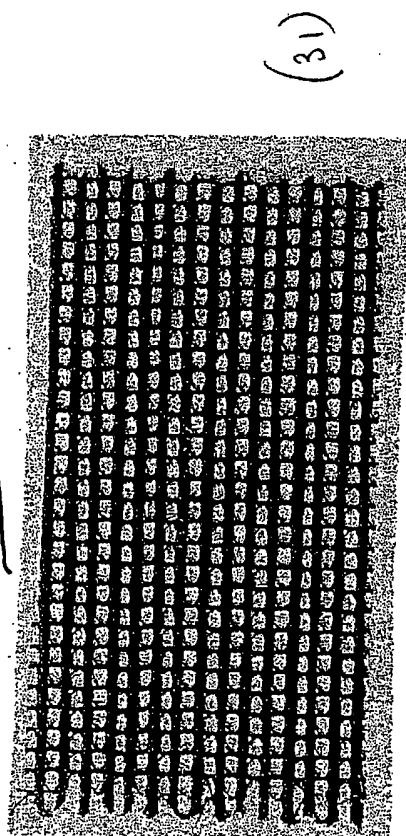


Fig 4

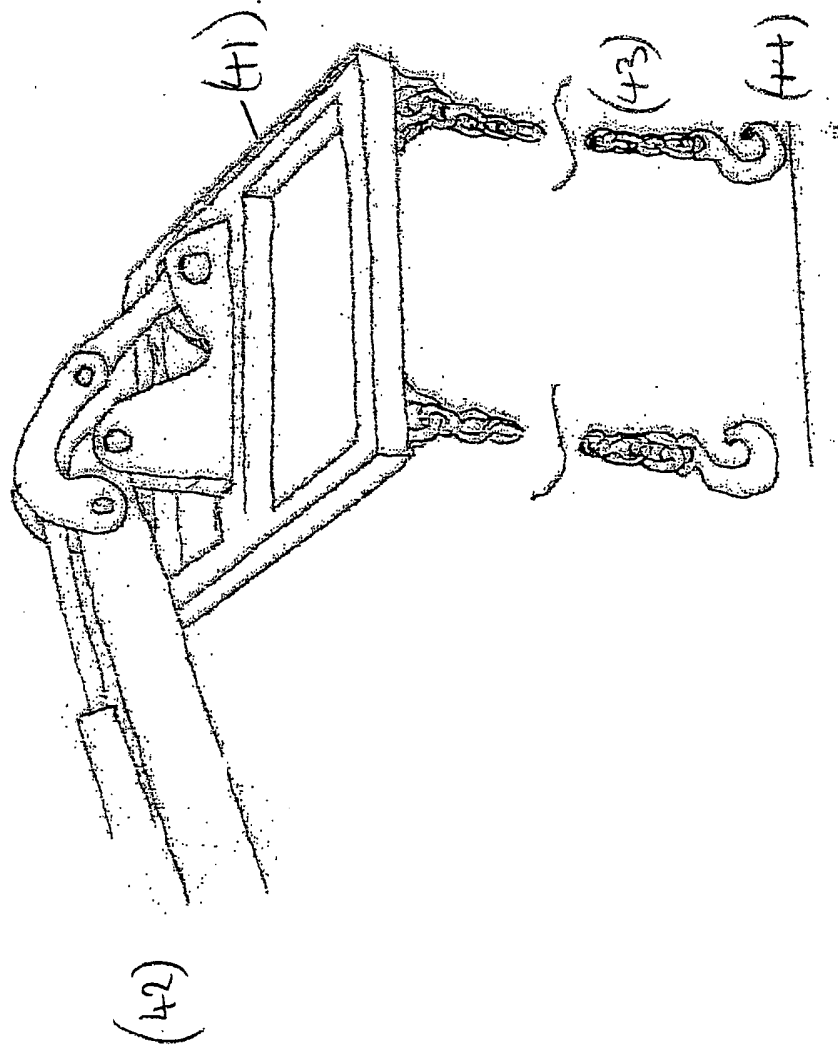


Fig 5.

