United States Patent

Mayer

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[54] ADJUSTABLE POT HOLDING MEANS FOR POTTING AND REPOTTING MACHINES

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Sept. 12, 1968 Germany ..... P 17 82 516.0

[52] **U.S. Cl.** **211/78**, 141/177, 141/378, 211/163

[51] **Int. Cl.** **A47g 29/00**

[58] **Field of Search** ..... 141/378, 177, 165; 221/241; 269/57; 248/131, 97 US; 211/71, 77, 1.5, 78, 144, 183, 163; 108/139

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Primary Examiner—Roy D. Frazier
Assistant Examiner—Abraham Frankel
Attorney—Woodhams, Blanchard and Flynn

[57] **ABSTRACT**

Pot holding means for filling pots or other containers such as with plant receiving material for the subsequent placement of plants therein. The pot holding means comprises two concentric rings, each having a set of brackets thereon which are spaced for appropriate engagement of pots by relative rotative movement of the rings with respect to each other. The rings may then be locked in position with the pots suitably insertable and removable from the brackets and the whole assembly rotated or otherwise moved for introducing the pots to a filling station.

22 Claims, 14 Drawing Figures

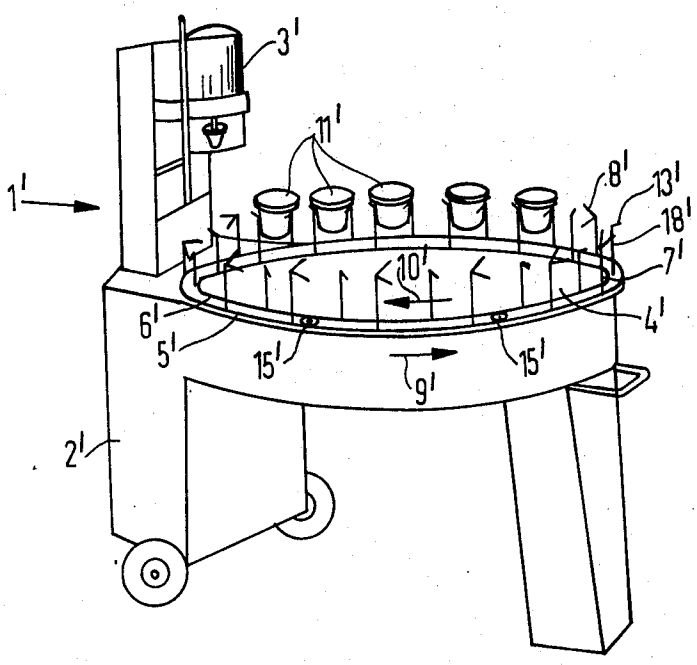


Fig.1

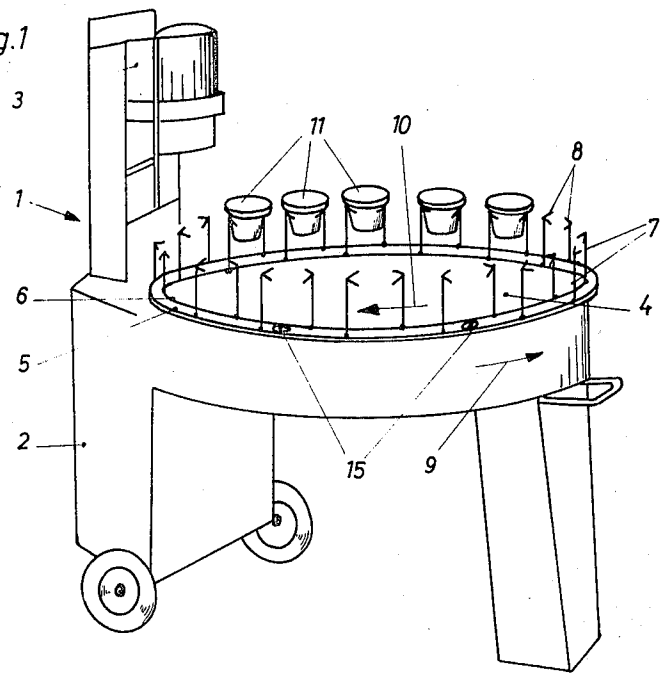


Fig.2

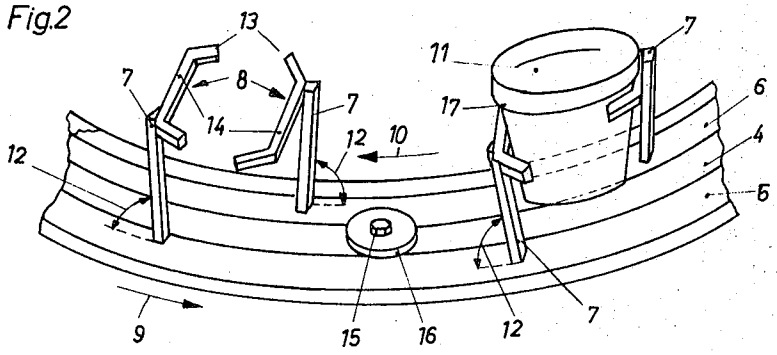


Fig.3

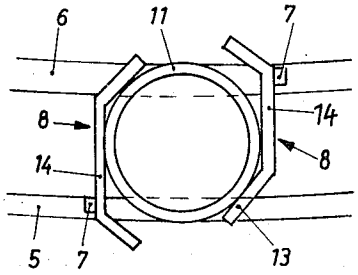
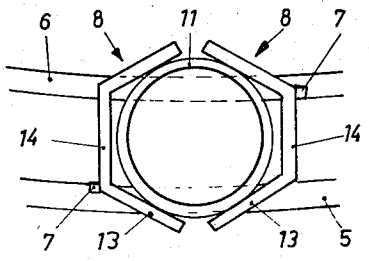


Fig.4



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Fig. 5

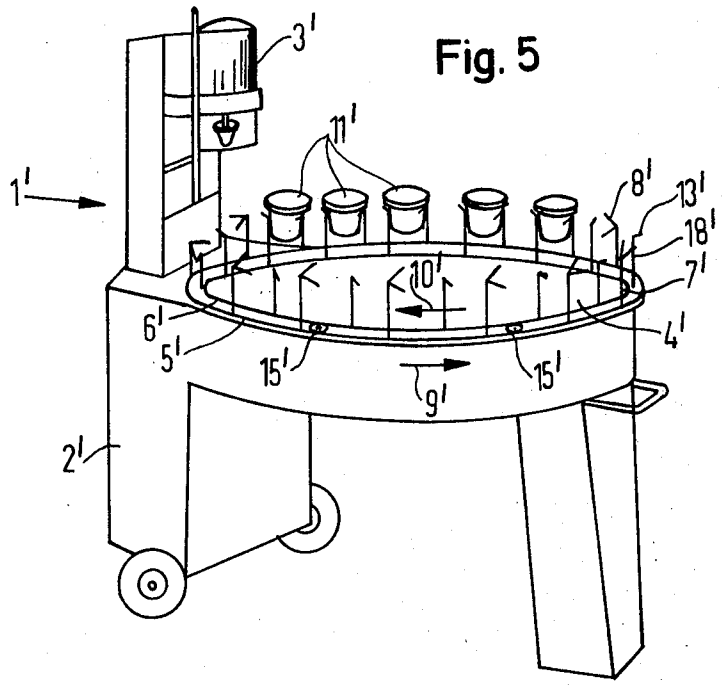


Fig. 6

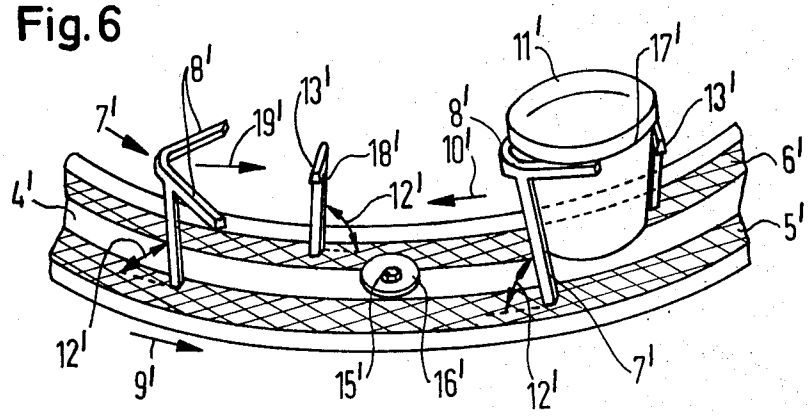
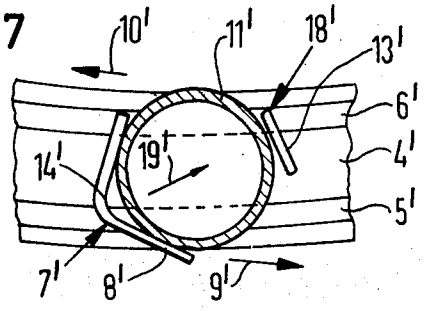


Fig. 7



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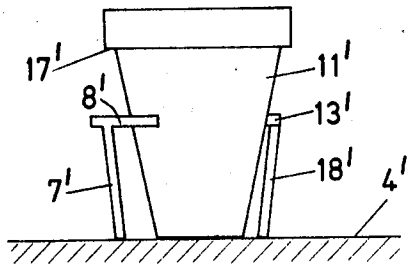


Fig. 8

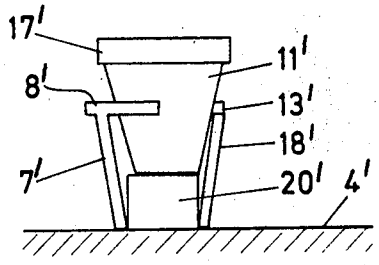


Fig. 9

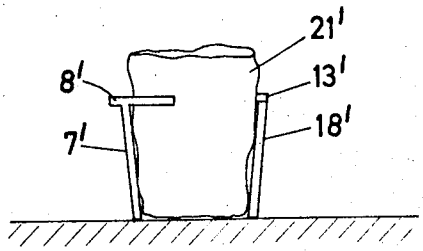


Fig. 10

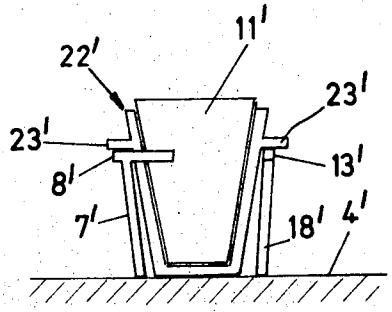


Fig. 11

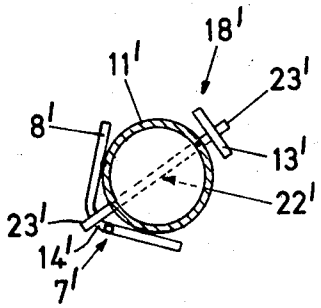


Fig. 12

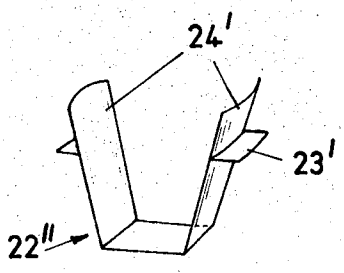


Fig. 13

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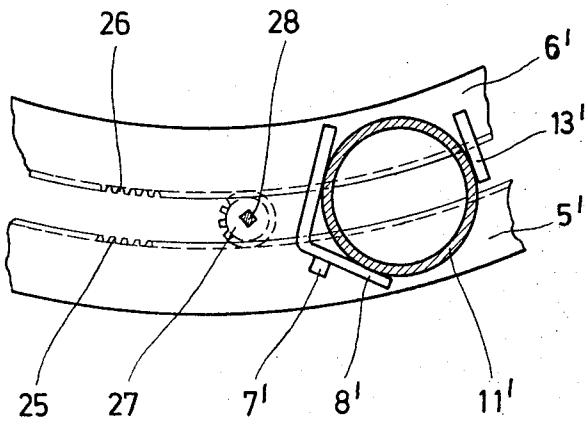


Fig. 14

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ADJUSTABLE POT HOLDING MEANS FOR POTTING AND REPOTTING MACHINES

The invention relates to an adjustable holding means for soil containers in potting and repotting machines having a rotary table which, for supporting the containers, for example flower pots, carries at its circumference a number of spaced-apart holders comprising angle brackets.

A repotting device is known which is provided on a stepwise movable rotary table with a number of pot holding means. The pot holding means each consist of two elastically covered V-shaped forks which are radially adjustable in relation to the center axis of a pot held between said forks. The adjustment for each single pot must be done by hand, which is complicated, time consuming and is also unsafe. Further, these holding means are constructed liftably and are for this purpose each connected with a vertically movable rod which penetrates the rotary table close to its circumference. Such a construction is therefore also mechanically complicated and expensive.

For automatically potting or repotting of plants it is required to feed the new pots uniformly, to fill them with soil, to remove soil from their centers and to insert the root balls into the hole so made. For these operations, a reliable, simply constructed pot holding means which can also be operated by semiskilled personnel is very important.

The basic purpose of the invention is to avoid the disadvantages of the known construction and to construct a simple and economically manufacturable holding means of the above-discussed type which can be operated quickly, comfortably and safely, which can be adjusted to various container diameters, in particular also very small container diameters, and which can receive the pressures occurring at the individual operating stations with the greatest possible care in the treatment of the soil containers.

To attain this purpose the invention provides two concentric ring arrangements of the rotary table, which ring arrangements are adjustable with respect to one another in circumferential direction and which each supports one group of holders in a manner to be adjustable by groups with respect to these circumferential directions.

These measures assure that with a single adjustment for all containers, for example pots, all holding means of the rotary table are operated simultaneously so that all containers are held at once or are freed at once. The adjustment of the ring arrangement is a very simple process which can also be performed quickly and safely by semi-trained personnel. In any case, an acceptable holding of the containers is obtained since an adjustment with respect to the respective actual diameter of all similar containers is obtainable. The construction and manufacture expense is thereby extremely low.

A holding means according to the invention which is particularly suitable for holding rigid flower pots is provided in that the two concentric ring devices of the rotary table each supports a group of holders, the angle brackets of which are each open in the same circumferential direction.

A particularly simple construction is obtained if, according to a preferred embodiment of the invention, the ring devices are constructed as rings mounted on the rotary table. The one group of holders is thereby secured to the outer ring, the other group to the inner ring.

To lower the manufacture expenses it is desirable to utilize a modification of the invention wherein the holders are rigidly secured to the ring arrangements. Thus, special bearing or adjusting devices are not needed.

According to the invention it is further desirable for the holders to define with the planes of the ring arrangements an angle corresponding to the tape angle of the pots. This facilitates the insertion or removal of the pots into or out of the holding means and also effects a favorable utilization of the space. It is sufficient if the opening angle of the pots is only approximated since the pots usually have a rim at their upper edge, which rim is supported by the angle brackets of the holders.

A further very advantageous characteristic of the invention is that the legs of the angle brackets are connected by a crossbar mounted on the holder and together define an angle which, independent of the diameter of the pot to be held, assures the contacting of the angle bracket onto said pot at at least two points. In the top view, these angle brackets can, for example, have the shape of a diagonally halved hexagon. Their legs can be straight or also bent, preferably outwardly, so that a safe contact is also assured in the case of pots having very large diameters.

A preferred embodiment of the invention has the special feature that the angle brackets approximately at the end of their crossbar, or approximately at the inner end of the legs, are connected to the holders with which they can also be made of one piece. Thus, it is assured in a simple manner that the angle brackets, in spite of their forklike opening and closing movement which necessarily occurs at an adjustment of the rings in circumferential direction, always abut the pot to be held. If, furthermore, the cross rods of the holders are directed radially to the centerpoint of the ring arrangements, thus perpendicularly to their circumference, the crossbar of the holder always abuts the pot independently of the diameter of the pot to be gripped so that an effective holding is assured at all times.

The holding means of the invention is also advantageously constructed in such a manner that the angle brackets of the first group of holders are forks on the one ring, the opening direction of which faces the second ring and the arm bracket of said second ring has only one leg.

One thus obtains an extremely simple, neat and safe three-point support. The circumference of each soil container so held is supported by the legs of a fork, which legs abut at two places, on one side and by the legs of the arm bracket at a third place on the other side. The arm bracket requires thereby only a little room so that it can be brought very closely to the fork of a holder of the first group. Thus, it is assured that even containers which have a very small diameter can be held safely and carefully.

This holding means of the invention is advantageously constructed in such a manner that the soil container to be secured between the holders, for example, a flower pot or a plastic bag filled with soil, rests with its base on a firm base and is held in such position by the holders only against a lateral shifting. In addition, if necessary, support pieces can be provided which permit an adjustment for the respective container height. Such support pieces can be adjusted also pneumatically or hydraulically, for example, by an inflatable water tube.

In a further embodiment of the holding means of the invention, the legs of the holders can engage from below a projecting lip at the upper edge of a flower pot so that the pot hangs on the holders. This arrangement is particularly suitable for mechanically insensitive and resistant soil containers.

It is particularly advantageous if the arm brackets are mounted on the second ring as L- or T-shaped supports, the short crosslegs of which are used for supporting the pot rim. The width of the arm bracket is in such case so small that it can, if necessary, be inserted into the fork of an adjacent holder of the first group. This does not only assist the proper holding of the pots independent of their diameter but makes it possible also to insert or to remove the pots quickly and without any danger because the holding means do not jamb.

According to a further embodiment of the invention, the legs of the arm brackets are advantageously arranged substantially transversely to the opening direction of the forks of the first group of holders. The legs of the holder and arm bracket thus abut the pot circumference approximately tangentially so that the holding means forces act mainly in radial directions. One thus achieves a very careful clamping or holding of the pots and in addition one can adjust the space within the holding means exactly as desired, for example, to obtain precisely a desired looseness for the pots within the holders. Further, by having the pots rest directly on the rotary table, if necessary with the interposition of support pieces, they need to be secured only laterally.

The angle brackets of the first group of holders have supports which support the preferably obtuse to rectangular forks associated therewith on one fork arm which is directed approximately in a circumferential direction or at an acute angle thereto, while the other fork arm is directed at least approximately radially to the ring and the opening direction intersects at least in the clamping position the leg of the adjacent arm bracket. Thus, the pots so held are evenly arranged on the center line between the two rings. Through this, the central filling, the providing of a plant hole in the pot filling and the insertion of plants is made extremely simple because shifting of single pots from this center line practically never occurs. The increased cleanliness of the operation brings about a corresponding reduction of time and material losses.

In the case of soil containers which are made of a flexible material, for example plastic pots, the container edge may not project very far upwardly over the holding means because it will not be able to resist a downwardly directed pressure in a given operating station and may often tear or become damaged. To remedy this, the holding means of the invention provides that an insert can be placed between each holder and the arm bracket associated therewith, which insert rests on the legs and itself receives the soil container. Thus, the downwardly directed pressure is transmitted in a simple manner through the holders or arm brackets onto the base so that the soil containers held thereon are released and the vertically acting forces are conducted away.

According to a further characteristic of the invention, the insert is a wire clamp, the height of which corresponds substantially to the height of the soil container to be received and which is provided with stops which can be suspended on the crosspiece of the fork on one side and on the crossleg of the arm bracket on the other side. The insert is advantageously dimensioned in its height in such a manner that the upper edge of the soil container to be received projects therefrom only slightly.

The insert is advantageously adjusted to the form of the soil container, in particular at its circumference, for example by means of clamp ears. Thus, when clamping in radial direction, a local overstress is avoided.

According to a further embodiment of the invention, the insert is so constructed that it can be placed or clamped on holders or arm brackets. These parts can also be very economically manufactured and offer the advantage of easy handling since they can, according to their need, be placed on the holders or arm brackets or can be removed therefrom very quickly.

Further advantages are obtained for the holding means of the invention if the holders and/or the angle brackets are constructed resiliently. A uniform contacting is thereby obtained in spite of the unavoidable manufacturing variations of the pots. Here resilient elements or materials can be used, for example, leaf springs or bar springs of a corresponding form and dimension. Plastics are also particularly well suited for protectively holding pots because of their softness and flexibility.

Alternatively or additionally, it is also possible that the two groups of holders may be biased elastically in opposite directions with respect to one another. In this manner one obtains at all times a good fit between the holding means and the pots because of the resulting adjustable contact pressure. A safe operating position is thus assured under all circumstances.

Another possibility is that the ring devices can be secured relative to each other. In this case the adjustment of the two groups of holders is done manually so that the adjustment to the center pot diameter can be done by the sense of touch. A further advantage of this construction is the low construction and manufacture expense consequent thereon.

By providing on the rotary table at least one setscrew with a flange which frictionally connects and engages both ring arrangements, an easily operable and simple control clamping device is obtained according to the invention. It can be supplemented or replaced by a locking device. Such a locking device can also contain magnetic elements. Ring arrangements are also suitable for adjusting or fixing, said ring arrangements being provided with teeth and having at least one intermediate pinion. Many other types of adjustment devices can also be used.

A particularly advantageous construction of the holding means of the invention is achieved by providing the inner ring with outer teeth and the outer ring with inner teeth, with an intermediate pinion being supported on the rotary table between the two rings. Said intermediate pinion is in engagement with the teeth of both rings and is rotatable and fixable from the outside for adjusting the rings. In this manner a sensitive stepless adjustment of the holding means is obtained.

Further characteristics and advantages of the invention will become apparent from the following description of exemplary embodiments in connection with the drawings, in which:

FIG. **1** is a three-quarter view of a potting or repotting machine with an adjustable pot holding means according to a first embodiment of the invention;

FIG. **2** is an enlarged section of a view similar to FIG. **1**;

FIG. **3** is a view of a pot which is held between two holders with angle brackets;

FIG. **4** is a view similar to FIG. **3**;

FIG. **5** is a three-quarter view of a potting or repotting machine with an adjustable holding means according to a further embodiment of the invention;

FIG. **6** is an enlarged section of a view similar to FIG. **5**;

FIG. **7** is a cross-sectional view of a pot fixed in the holding means of FIG. **5**;

FIGS. **8** to **10** are schematized side-elevational views of soil containers fixed in the holding means of the invention;

FIG. **11** is a schematized side-elevational view of a pot with an insert fixed in a holding means of the invention;

FIG. **12** is a schematized top view, partly in cross section, of the arrangement of FIG. **11**;

FIG. **13** is another embodiment of an insert for a holding means of the invention; and

FIG. **14** is a detail of a holding means according to a still further embodiment of the invention.

In the three-quarter view of FIG. **1**, a potting or repotting machine **1** is illustrated which machine has a drilling device **3** on a movable frame **2**. A further device for filling pots with soil is not illustrated in order to avoid confusingly complicating the drawing. The repotting machine **1** is provided with a rotary table **4** which supports an outer ring **5** and an inner ring **6**. Both rings **5**, **6** are adjustable in opposite circumferential directions. Each of these rings is provided with a group of holders **7** which have angle brackets **8** which open in one of the two circumferential directions of rotation **9** or **10**. In the illustrated embodiment, angle brackets **8** of the holders **7** on the outer ring **5** open in the circumferential direction **9**, while the angle brackets **8** of the holders **7** on the inner ring **6** open in the opposite circumferential direction **10**. On the back half of the rotary table **4**, there are illustrated pots **11** which are held by pairs of the holding means **7**. Setscrews **15** are provided for fixing the rings **5**, **6** against one another.

FIG. **2** shows details of the arrangement of the invention. The one group of holders **7** which has the angle brackets **8** opening in circumferential direction **9** is rigidly secured on the outer ring **5**. The inner ring **6** supports rigidly secured holders **7** with angle brackets **8** which are open in the opposite circumferential direction. By rotating both rings **5**, **6** in opposite directions, the space between the two groups of holders can be adjusted simultaneously and uniformly. The adjustment is done in such a manner that the pots **11** can rest on the angle brackets by their rims **17**. However, it is also possible to hold the pots further downwardly at a different portion of their surface. The rings **5**, **6** can be biased resiliently in opposite directions. However, it is also possible to construct the rings freely movably and to provide setscrews **15** which frictionally connectingly engage both rings **5**, **6** with their flange **16**. Another embodiment provides that the circumferential sides of the rings **5**, **6** which face one another have teeth which are engaged with at least one pinion provided therebetween. A

rotation of the pinion about its axis which is fixed with respect to the rotary table 4 causes the movement of the rings 5, 6 in the opposite circumferential directions 9 or 10. It is also possible to construct the pinion as a ratchet wheel which permits an adjustment only if first a ratchet or another stop device is released.

The top view of FIG. 3 illustrates an advantage of the holding means of the invention. The angle brackets 8 of the holders 7 are provided with crossbars 14 which are directed radially of the center of the rings 5, 6. The angle brackets 8 are each mounted at the intersection of a leg 13 and the crossbar 14. Both legs 13 of each angle bracket 8 extend over the respective rings 5, 6. Thus, it is assured that the pots 11 are held securely independent of their diameter, at least between the legs 13, approximately in the center between ring 5 and ring 6.

FIG. 4 illustrates a further possibility wherein the angle brackets 8 have long crossbars 14 and shorter legs 13. Here too, the holders 7 which are secured on the outer ring 5 project over the ring 6 with their angle brackets 8 while the holders 7 secured on the ring 6 extend their angle brackets 8 into the zone of the outer ring 5. In this embodiment, smaller pots 11 fit snugly into a groove between the crossbar 14 and the one leg 13 by having the leg 13 which is spaced from the holder 7 in each angle bracket 8, together with the associated crossbar 14, rest against the pot 11.

The clamplike opening and closing movement of the angle brackets 8 associated with one another effects in neither of the two embodiments any lateral shifting of the abutment location or holding point for the pots 11.

FIG. 2 shows that the holders 7 can be inclined at an angle 12 with respect to the plane of the rings 5, 6, which angle corresponds substantially to the degree of taper of the pots 11. This makes the insertion and removal of the pots easier and assures at the same time an optimum use of space.

The invention is not limited to the illustrated embodiments. Thus, it is also within the scope of the invention that the one of the two rings 5, 6 is rigidly connected to the rotary table 4 or is made of one piece therewith and that only the second ring is adjustable with respect to the first ring or with respect to the rotary table 4. It is thereby of no importance whether or not the adjustable ring is mounted on the inside or outside since only the relative adjustability is important. Insofar as by this machine pots having a larger diameter compared to smaller pots become located at a different radial distance from the center, which can be of importance for locating the pots with respect to a work station, this can be balanced out by a single total shifting of the rotary table 4. The pressing in of the soil and the drilling out can therefore also in this case be done exactly as with the respective stationary devices.

Many different materials and forms can be used for the pot holding means of the invention. Particularly advantageous are resiliently or flexibly constructed holders 7 or angle brackets 8 which can, for example, be made of plastic. It is also possible to bias both rings 5, 6 elastically against one another so that independent of the movement of the rotary table 4 an even pressure of the holding means 7 or the angle brackets 8 on the pots 11 is assured. The amount of the pressure can be adjusted by known means. It is also possible to provide adjustable stops which prevent a too great adjustment of the rings 5, 6 with respect to one another in both circumferential directions 9, 10.

FIG. 5 illustrates a further exemplary embodiment. In the three-quarter view of FIG. 5, there is shown a potting or repotting machine 1' which has a drilling device 3' on a movable frame 2'. A further device for filling the containers with soil is omitted to avoid unduly complicating the drawing. The repotting machine 1' is provided with a rotary table 4' which supports an outer ring 5' and an inner ring 6'. Both rings 5', 6' are adjustable in opposite circumferential directions. Each ring is provided with a group of holders, namely the outer ring 5' has a first group of holders 7' which have angle brackets in form of forks 8' and which are open in circumferential direction 9'. The direction of opening 9' faces thereby the inner ring 6' which supports a group of arm brackets 18', each of which have only one leg 13'. To clamp containers of soil, in particular flower pots 11', the outer ring 5' carrying the first group of holders 7' is adjusted in circumferential direction 9' and/or the inner ring 6' while the arm brackets 18' are adjusted in an opposite circumferential direction 10'. On the back half of the rotary table 4' there are illustrated pots 11' which are held by pairs of each one holder 7' and one arm bracket 18'. Setscrews 15' with flanges 16' which engage said two rings both frictionally and connectingly are provided for fixing the rings 5', 6' against one another.

FIG. 6 shows details of the arrangement of the invention. A first group of holders 7' is rigidly secured on the outer ring 5', the angle brackets of said holders having supports which support the forks 8' associated therewith on a fork arm. A first set of fork arms are directed approximately in the circumferential direction 9' or at an acute angle thereto. The other fork arms project from the first thereof at an obtuse or right angle and are positioned at least approximately radially of the ring 5'. The direction of opening 19' of the forks 8' intersects at least in the clamping position the leg 13' of the adjacent arm bracket 18' which is rigidly secured on the inner ring 6'. By adjusting the two rings 5', 6' in opposite directions, the space between the two groups of holders can be adjusted simultaneously and uniformly. The rings 5', 6' can be biased resiliently in opposite directions but can also be freely adjustable, particularly if no clamping is intended but only a lateral locating. Setscrews 15' which frictionally and connectingly engage both rings 5', 6' with the flanges 16' are used for anchoring (FIG. 6) said rings. Also other embodiments, as above described, of the adjustment device are possible.

The pots 11' can rest with their flange or projecting edge 17' on the legs of the fork 8' on one side and on the legs of the arm bracket 18' associated therewith on the other side. However, it is also possible to hold the pots further downwardly at a different part of their surface, in particular if the pots rest with their bases (FIG. 8) on the ring. Support pieces 20' (FIG. 9) of various heights can also be provided therefor in order to provide an adjustment for the height of the respective pots. The support piece 20' can, for example, be an inflatable tube in which simply by changing the pressure, the height of the layer can be adjusted to the respective needs. Other containers can also be handled by this construction, for example, bowls, plastic bags 21', etc. (FIG. 10).

From the top view of FIG. 7 and also of FIG. 12, it is apparent that a clamped pot 11' is held firmly at three points therein schematically illustrated. Both the arms of the fork 8' and of the leg 13' essentially tangentially abut the circumference of the pot 11'. Smaller pots 11' have their support points further inwardly on the fork 8'. In an extreme case, they fit snugly into a receptacle formed by the bar 14' of the fork 8', while the arm bracket 18' associated therewith by the free end of its leg 13' contacts the opposed circumferential surface. In FIG. 7, the space between the two rings 5', 6' is intentionally exaggerated in order to illustrate the clamping condition particularly clearly. The illustrated pot 11' has a very small diameter but even if the diameter would be half of the illustrated size, which can be the case, for example with cactus pots, a perfect holding would still be assured. Furthermore, it must be emphasized that the clamplike opening and closing movement of the cooperating holding means 7' and 18' does not cause any lateral shifting of the pots 11 held thereby.

From FIG. 6 it can be seen that the holders 7' or 18' can be inclined at an angle 12' with respect to the plane of the rings 5', 6', said angle corresponding substantially to the taper of the pots 11'. This makes the insertion and removal of the pots 11' easier and assures at the same time an optimum use of space. Because the pots 11' have a rim or projecting edge 17' at their upper edge, which rim or projecting edge 17' is engaged by the fork 8' or the leg 13', the angle of inclination 12' can, in practice, be larger than the angle of taper of the pots 11'.

In the embodiment according to FIGS. 11 and 12, the soil container 11' is held between the holders 7' and the arm bracket 18' with the interposition of an insert 22'. The insert 22' is a metal clamp in the illustrated embodiment, the form of said clamp being adjusted to the form of the pot to be received. The side pieces of the metal clamp 22' are sufficiently high that the pot 11' to be received projects only slightly therefrom. They are provided with stops 23' which can engage the crossbar 14' of the fork 8' on one side and the cross leg 13' of the arm bracket on the other side. Downwardly acting pressure is therefore transmitted through the stops 23' of the insert 22' onto the holders 7' or the arm brackets 18' and from there diverted to the base. As has already been mentioned, in this arrangement a three-point locating is also provided (FIG. 12).

In order to avoid a local overstress, the insert 22'' can be adjusted in particular at the ends of its side pieces to the circumferential form of the soil container 11 for which, for example, clamp ears 24' can be used (FIG. 13). The insert 22'' can hereby be made in a simple manner by a sheet-metal strip which is bent suitably and supports the stops 23'.

Another possibility is that the insert 22'' is constructed in form of parts which can be attached or clamped onto the holders 7' or the arm brackets 18'. Here too, stops 23' can be provided with which the parts are positioned on the fork 8' or the crossleg 13'.

Also within the scope of the present invention are varying embodiments of the rotary table 4' with a step drive and the adjustment device for the rings 5', 6' including stops and elastic and/or resilient means, as well as different types of materials and forms.

Further, it must be emphasized that the holding means of the invention can easily be used to hold plastic bags, bowls and the like at a predetermined place in order to fill same with soil, etc., to make a hole for a plant and to insert a plant. To catch soil and plant parts which may be falling off, a cover plate can be provided which protects the rotary table 4' with the rings 5', 6' and, if desired, forms the stationary support for the soil containers 11'.

FIG. 14 illustrates a holding means of the invention, wherein the inner ring 5' has outer teeth 26 and the outer ring 6' has inner teeth 25. Both rings are supported rotatably on the rotary table. An intermediate pinion 27 is supported rotatably about its center axis on the rotary table between the two rings 5', 6'. The intermediate pinion 27 engages the teeth 25 and 26 of both rings 5', 6'. A four-cornered shaft 28 is secured along the axis of the intermediate pinion 27. A crank which need not be illustrated to clearly understand the drawing can be placed on said four-cornered shaft, by means of which crank the intermediate pinion is rotatable. By rotating the intermediate pinion 27, the rings 5' and 6' are rotated relatively to one another and through this the legs 8' and 13' of the holders 7' and arm brackets are adjusted relatively to one another. In this manner, an adjustment of the holding means to each container size is obtained. The fixing of the rings 5' and 6' in an adjusted position can be done, for example, by means of the setscrews 15' with flanges 16' illustrated in FIG. 6. It is, for example, also possible to drive the intermediate pinion 27 through a gearing by means of an electric motor. Special devices for fixing the rings are then no longer needed. After the motor is deenergized, the rings 5', 6' remain in each obtained position.

All characteristics and advantages of the invention which are disclosed in the claims, the description and the drawings including structural details and method steps can also be important to the invention in any desired combination.

What is claimed is:

1. In a potting and repotting machine, an adjustable holding device for earth containers, comprising:

a table;

first and second concentric and coplanar annular rings rotatably mounted on said table;

a plurality of angularly spaced, upstanding post-like members mounted on each ring, each of said post-like members including an upright holder secured to one of said rings and an angle bracket connected to said holder, said angle brackets on the holders on said first ring being adapted to cooperate with adjacent angle brackets on the holders on said second ring to engage angularly spaced points on said containers and to maintain said containers in an upright position.

2. The adjustable holding device according to claim 1, wherein said sidewalls of the containers are tapered; and

wherein the upright holders define with the surfaces of the rings an angle corresponding to the taper of the containers.

3. The adjustable holding device according to claim 1, wherein each angle bracket includes a crossbar and legs at opposite ends thereof; and

wherein the legs of each angle bracket are secured to the crossbar on each holder and together define a configuration which, whatever the diameter of the container to be held, assures the abutment of the angle bracket against said container in at least two points.

4. The adjustable holding device according to claim 3, wherein the angle brackets are connected to their holders at one of the ends of their crossbars and at the inner ends of the legs.

5. The adjustable holding device according to claim 3, wherein the crossbars of the holders are radially directed with respect to the center of the concentric rings.

6. The adjustable holding device according to claim 1, wherein one of said holders and said angle brackets are constructed resiliently.

7. The adjustable holding device according to claim 1, wherein said holders on said first and second rings are biased elastically in opposite directions towards one another.

8. The adjustable holding device according to claim 1, including means for locking the concentric rings in selected positions with respect to each other.

9. The adjustable holding device according to claim 1, wherein the table includes at least one setscrew having a flange which frictionally engages both concentric rings.

10. The adjustable holding device according to claim 1, wherein the inner ring has outer teeth and the outer ring has inner teeth and an intermediate pinion is supported on the table between both rings, said intermediate pinion being in engagement with the teeth of both rings and being rotatable and securable from the outside for adjusting the rings.

11. The adjustable holding device according to claim 1, wherein the angle brackets of a first group of holders are forks on the first ring, the opening direction of each of said forks facing an adjacent angle bracket of a second group of holders on the second ring consisting of only one crossbar.

12. The adjustable holding device according to claim 10, wherein said containers are flower pots; and

wherein the legs on the angle brackets engage the underside of a projecting edge at the upper edge of each flower pot so that the pot hangs on the holders.

13. The adjustable holding device according to claim 10, wherein each holder with its angle bracket mounted on the second ring defines an L- or T-shape; and

wherein each of said angle brackets on the second ring constitutes a relatively short crossbar for supporting the soil container.

14. The adjustable holding device according to claim 10, wherein the crossbars of each of the angle brackets of the second group are arranged substantially transversely to the opening direction of the forks of the first group of holders.

15. The adjustable holding device according to claim 10, wherein one leg of the angle brackets of the first group of holders extends generally in one circumferential direction and at an acute angle thereto, while the other leg extends at least approximately radially to the rings and the opening direction of the two legs intersects at least in the clamping position the crossbar of the adjacent angle bracket.

16. The adjustable holding device according to claim 10, including an insert between each pair of opposed coacting holders and the angle brackets associated therewith, said insert resting on the legs and crossbars and itself receiving the soil container.

17. The adjustable holding device according to claim 16, wherein the insert is a metal clamp, the height of which corresponds substantially to the height of the soil container to be received therein and which metal clamp is provided with stops which are suspendable on the angle brackets of the first group of holders on one ring and on the crossbars of the second group of holders on the other ring.

18. The adjustable holding device according to claim 16, wherein the insert is adjusted to the form of the soil container in particular at its circumference by means of clamp ears.

19. The adjustable holding device according to claim 16, wherein the insert includes means for permitting an attachment thereof to one of said holders and arm brackets.

20. The adjustable holding device according to claim 1, wherein said containers are supported on said rings and said post-like members provide lateral stability for said containers.

21. The adjustable holding device according to claim 20, including a support piece for supporting said containers in vertically spaced relation to said rings.

22. The adjustable holding device according to claim 1, wherein said angle brackets and said holders include means adapted to support said containers in vertically spaced relation to said rings.

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