

POSITIONING DEVICE, HOLDING DEVICE AND EXHIBITING DEVICE

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[Technical field of the invention]

The invention relates to an exhibit device for exhibiting a large number of exhibited items in a desired spatial layout.

[0002]

[Prior Art]

Hitherto it has conventionally required a lot of work and time in the case of exhibiting a large number of exhibited items in a desired spatial layout, for example, arranging a large number of flowers for a large ceremony such as funerals and marriages or celebrations in order to decorate the stage in an altar-like fashion. For altars, assembled structures have been known such as the one disclosed by Japanese Unexamined Patent Publication No. 2000-14533. However, despite the fact that adoption of such a structure makes the assembly work for decorative stands easier, it still requires a lot of labor

- 2 -

and time to decorate the ceremonial stand with a large quantity of flowers according to a specified expressive pattern. It has been especially difficult to arrange each flower to exhibit a complex expressive pattern such as to express a curved surface or to express letters with flowers.

[0003]

[The problem to be solved by the invention]

In consideration of the problems mentioned above, the present invention is intended not only to simplify the assembling of decorative stands for exhibiting a large number of exhibited items in an altar-like fashion to produce a large scale exhibit, but also to make the work itself easier for exhibiting a large number of exhibited items arranged in a particular expressive pattern to produce a large scale exhibit, as well as to propose an exhibiting device and a holding device that makes the position of the setup and adjustment of the exhibited items easier.

[0004]

[Means of solving the problems]

The invention is an exhibiting device exhibiting multiple exhibited items in a desired layout pattern, wherein:

said exhibiting device has such a structure that, assuming said desired layout pattern is divided into multiple segments, the exhibited items in each segment in a certain layout pattern are exhibited as a single module, wherein each of said modules consists of:

- (1) a stand;
- (2) a specified number of shafts mounted horizontally at a specified position at the upper end of said stand according to the layout pattern each segment is supposed to exhibit;

- 3 -

(3) a specified number of positioning devices to be inserted to specified positions of said shafts according to the layout pattern each segment is supposed to exhibit;

(4) poles to be inserted vertically into said specified number of positioning devices and held to heights according to the layout pattern, which each segment is supposed to exhibit; and

(5) holding devices that are mounted on the upper end of said poles to hold and exhibit exhibited items in the layout pattern that each segment is supposed to exhibit;

and,

each of said positioning devices comprise a setup/holding means that sets up and holds the position of the positioning device on the shaft and a detent mechanism that adjusts and holds the height of the pole.

[0005]

Further, each holding device has multiple holding parts characterised in that said multiple holding parts form an array of multiple columns, where the holding parts that constitute each column maintain an offset positional relationship relative to adjacent columns, thus creating a staggered positional pattern of holding parts as a whole when multiple holding devices are densely placed. Moreover, each holding part contains a spherical member that fits therein, while said spherical member has a through hole, into which a member being held is inserted to be held; and said spherical member is constituted in such a way that it is rotatably fitted inside the holding part so that the holding direction of the member being held is adjustable.

[0006]

- 4 -

Further, it is preferable that the size of the opening at the bottom of the through hole is smaller than the size of the opening at the top of the through hole in order to make it easier to hold the member being held. Furthermore, said holding device comprises a pole receiving part to mount the holding device itself to the upper end of a pole, where said pole receiving part has a spherical member that fits therein; and said spherical member having a through hole for supporting said holding device when the upper end of said pole is inserted therein, wherein said spherical member is constituted in such a way that it is rotatably fitted inside the pole receiving part so that the supporting direction of the holding device is adjustable.

[0007]

Herein, the setup/holding means can adopt an arrangement in which said setup/holding means holds the positioning device at a desired position of the shaft by clamping the shaft by means of a clamping mechanism using a bolt. Furthermore, said setup/holding means may adopt an arrangement in which the setup/holding means has a detent mechanism, where the positioning device is held at a desired position on the shaft by means of said detent mechanism.

[0008]

[Preferred Embodiment of the invention]

An embodiment of the invention applied to a case of decorating a stage in an altar-like fashion with a large number of flowers will be described in detail below.

A cross sectional view of an altar of the embodiment is shown in Fig. 19. The figure shows a step-like stand 1,

poles 3 that are mounted on the top surfaces of the stand, bases 2 that are mounted on the poles 3, and flowers that are attached to the bases 2 (bases 2 function as a holding device to hold flowers). In this embodiment, the stand 1, multiple poles and bases mounted on the stand 1 constitute a single module, and multiple modules are arranged in a step-like manner using an auxiliary stand 999 to form an altar.

[0009]

Next, the structure of the module will be described referring to Fig. 1. For the sake of easy understanding, this figure shows that two poles are placed on the first step of the stand that consists of two steps and one pole on the second step. The stand of the module is constituted of a frame 10 by assembling many pieces of frame members as shown in the figure. On its top surface, a shaft 4 is mounted via a mounting member 6. A slider 5 is held at appropriate distances from both ends of the shaft 4, while a pole 3 is mounted on the slider 5 to a desired height.

[0010]

The structure of the slider 5 will now be described using an enlarged drawing of Fig. 2. As shown in the drawing, the shaft 4 and the pole 3 have the same hollow shape, and have multiple detent holes 40 and 30 formed in line along the longitudinal direction. Fig. 3 shows the cross-section of the shaft 4. As shown in Fig. 2 and Fig. 3, concave areas 41

are formed along its longitudinal direction on the shaft 4, while rows of multiple detent holes are formed on both sides of the concave areas. On the other hand, the slider 5 has detent engagement mechanisms in the inside, and both the shaft 4 and the pole 3 are engaged with the slider 5 through the detent engagement mechanisms to bind them together in the status shown in Fig. 2.

[0011]

Under this status, when the shaft 4 and the pole 3 are rotated in the Y direction shown in the drawing, the detent engagements can be easily released to allow the slider 5 to move freely in the direction A shown in the figure and the pole 3 to move freely in the direction B. When the shaft 4 and the pole 3 are rotated in the direction N or the direction Y when the desired moving positions are reached, their positions will be locked again as the detent mechanisms becomes engaged. In this embodiment the slider 5 functions as a positioning device to set up the spatial position of base 2.

[0012]

Although the slider shown here is rectangular, it is not limited to this particular shape but rather may be a spherical shape, as long as it has the detent engagement mechanisms described above. Fig. 4 shows a type of the slider that has a substantially reduced weight while maintaining the necessary strength. In this case, the slider consists

of a pipe-like part 57, through which a shaft 4 is inserted, and a pipe-like part 58, through which the pole 3 is inserted, while they are connected with pipe-like parts 56 and 59 containing detent mechanisms respectively.

[0013]

The detail of the detent engagement mechanism in the slider will be described referring to the case of Fig. 4. Fig. 5 is a cross sectional view of the slider on a plane that contains the centerlines of the pipe-like parts 56 and 59 and the centerline of the pipe-like part 58 shown in Fig. 4. The figure shows engaging pieces 52 and 55 that are energized toward the shaft 4 and the pole 3 by means of springs 51 and 54 respectively, and the positional relations between slider 5 and the shaft 4 and the pole 3 will be fixed as the protruding parts of the tips of these engaging pieces engage with the detent holes 40 and 30 respectively. The figure also shows stoppers 50 and 53 that are affixed to the open ends of the detent mechanisms of the slider 5 by means of screw mechanisms.

[0014]

The detent holes provided on the shaft 4 and the pole 3 are formed in such a way that the detent engagement can be released only when the shaft 4 and pole 3 are turned in the Y direction, and the concave area 41 faces the protruding

part of the detent engaging piece in case of the shaft 4 when it is turned in such a way, thus enabling the slider 5 in the axial direction of the shaft 4. The detent mechanism of the pole 3 can similarly be released to allow it to be moved similarly in order to adjust the height of the base 2 that supports a flower.

[0015]

The cross sections of the shaft 4 and the pole 3 are not limited to the one shown in Fig. 3 but can assume many other variations, e.g., Fig. 6. Moreover, although only one row of detent holes is formed on each side of the concave area in Fig. 3 and Fig. 6, only one row on one side of the concave area can be formed as well. Furthermore, although the shaft and the pole described above are made hollow, they can also be solid.

[0016]

The base 2 shown in Fig. 1 will now be described. Although the shape of the base 2 is shown in Fig. 1 as a plate for the sake of simplicity, the detail of its actual shape is as shown in Fig. 7. This figure shows that a base 2 is mounted on an end 32 of the pole 3 and a flower is held by a flower vase 7 at one of the six places (holding parts 21 through 26) of the base 2.

[0017]

The figure also shows that the holding parts 21 through 26, a pole receiving part 27, and connector parts 28 and 29 constitute the basic structure of the base 2 and Fig. 8 is the plan view of the basic structure seen from the direction G shown in Fig. 7. The parts 21 through 27 all have identical cross-section structure and Fig. 9 (1) shows as an example the cross-section of the part 23 taken at the chain line AB of Fig. 8.

[0018]

The internal shapes of the parts 21 through 27 are formed to match exactly with the shape of the spherical member 210 having a tapered through hole as shown in the cross sectional view indicated in Fig. 9 (2) and perspective view indicated in Fig. 9 (3), and the flower vase 7 is inserted and held via this spherical member in case of the holding parts 21 through 26. Fig. 10 shows the cross sectional view of these parts as the flower receiving part 21 is holding a flower vase via the spherical member 210. In the case of the pole receiving part 27, the spherical member 210 which is placed up side down is fitted into the pole receiving part 27, after which the end of the pole 3 shown in Fig. 11 is inserted into the spherical member and a spherical part 31 of the pole 3 is made to abut with the tapered surface of the spherical member 210 to hold the base at the end of the pole (see Fig. 7).

[0019]

As can be seen easily from Fig. 10, the direction of the vase can be adjusted arbitrarily to a degree after the vase has been mounted on the spherical member and bolts 77 and 78 can be tightened to hold the spherical member 210 firmly after the angle of the vase has been adjusted, so that the flower can be held in a stable manner in a desired direction.

Fig. 12 is an enlarged drawing of the clamping part of the bolt 77. As shown in this figure, an elastic ring-like packing 150 is inserted between the bases to prevent them from possible damage due to over-tightening of the bolts.

[0020]

As shown in Fig. 8 the holding parts 21, 22 and 23 and the holding parts 24, 25 and 26 are arranged to have an offset positional relationship to each other, so that the total layout pattern of the flower receiving parts appears as staggered as shown in Fig. 13 when many shafts and poles are placed densely on the stand of a module (the pole receiving parts are drawn smaller than the holding parts and all other structures are not shown in this drawing so that the layout of the holding parts can be seen more clearly). Therefore, when certain patterns (e.g., flower letters) are to be displayed on an altar using

a large number of various kinds of flowers, the arrangement described above will provide an improved effect in expressing the pattern more clearly as the curvy parts of the pattern can be shown more smoothly compared to a case where the flower receiving parts are placed in a rectangular grid.

[0021]

Although the above embodiment uses the holding parts are arranged in two rows (a row of parts 21 through 23 and a row of parts 24 through 26), more rows, e.g., three or four rows of them can be used as long as holding parts in adjacent row are arranged in an offset relationship to each other in order to attain the same effect described above.

[0022]

The connector parts 28 and 29 shown in Fig. 7 are provided to connect adjacent bases using connecting members which is shown in Fig. 14 to hold them together in a stable manner when a large number of bases are arranged, wherein a spherical part 280 is fitted into the connector part of a base, while one of the spherical parts 281 through 286, which is at the optimum interval will be selectively fitted into the connector part of another adjacent base (for example, in Fig. 14, if the spherical part at the optimum interval is the part 283, the connecting member is cut off at the point P to be used).

[0023]

The detailed structure of the mounting member 6 in Fig. 1 will now be described referring to Fig. 15. As shown in this figure, the mounting member 6 comprises an almost concave-shaped shaft holding part 60 and an affixing part 61. The shaft holding part has at its bottom a protruding part that fits with a guide groove 100 formed on the top surface of the frame 10. By sliding the shaft holding part along the guide groove to a desired position, inserting the end of the shaft 4 into a hole 600 of the shaft holding part 60, tightening a bolt in a screw hole 601 to clamp the shaft, and simultaneously tightening bolts in the clamping parts 610 and 611 of the affixing part 61, the frame 10, the affixing part 61, the shaft holding part 60 and the shaft 4 are all affixed thus completing the mounting of the shaft to the frame 10. Although the stand 1 in this embodiment consists of frames, it is also possible to constitute surfaces other than the top surface of the stand with panels.

[0024]

The following advantages exist in assembling the module in the embodiment described in the above. As the frame 10 has guide grooves on all of its four sides as shown in Fig. 15, there is no need to choose a particular side to find a groove in assembling the stand with the frames, which makes

the work simpler. Also, all shafts and poles have scale graduations cut to indicate distances along the lengthwise direction so that it is easier to determine the slider's position on the shaft 4 and the height of the pole. Although not explicitly shown in Fig. 15, scale graduations are cut on the frame as well along its lengthwise direction, so that the positioning of the mounting member on the frame can be done easily as well.

[0025]

Outlines of several example modules are shown in Fig. 16. An example where these modules are combined to form an altar-like assembly is shown in Fig. 17.

By adopting such a modular structure, the work of planting flowers into holding parts of modules can be easily automated. Since all the spatial positions of the holding parts can be completely specifiable by the positioning data of the mounting members on the frame, the positioning data of the sliders on the shafts, the pole height data, and the data specifying which of the six holding parts in the base is used, it is possible to enter all the data concerning the positions of these holding parts and the type of flower to be placed at each holding part into a computer and to do the entire flower placing work automatically with the controlled robot arm.

[0026]

Furthermore, it is possible to complete each module using the above-described automatic flower arrangement process at the factory beforehand, transport such modules to the hall where the ceremony is to be conducted, and assemble these modules according to the predetermined layout to thus quickly complete a large altar without great effort at the site. The above-described automatic flower placing mechanism can be used very effectively in such a case where the surface of the altar has complex curvatures (see Fig. 17), or where the surface of the altar has a complex pattern using multiple kinds of flowers. It goes without saying that the work of assembling frames to form a stand and the work of assembling shafts, poles and bases to a stand can also be automated.

[0027]

The technology of adjusting the height of a pole that supports a base by means of the detent mechanism as explained in the above embodiments can be applied immediately to other supporting mechanisms, such as a camera tripod or an electric lamp stand. The supporting mechanism using the shaft and pole in said embodiments can be modified to other applications as well. For example, it is possible to have the vertical pole fixed, maintain both ends of the horizontal shaft unfixed, mount a member-to-be-supported on one end of the horizontal

shaft, make it possible to adjust the height of the member-to-be-supported by means of sliding the slider vertically along the vertical pole, and adjust the horizontal position of the member-to-be-supported by means of moving the shaft horizontally. For applicability of such a supporting mechanism, mechanism for supporting a microphone in a picture taking session of a TV camera can be given.

[0028]

If a pole with a cross-section structure as shown in Fig. 3 or Fig. 6 is used, the angle (direction) within a horizontal plane for holding the shaft by means of the detent engagement can be arbitrarily selected from two angles as multiple detent holes exist within the same horizontal plane for holding the shaft by means of the detent engagement.

Although the structure of the base in the embodiment described above is designed to make the insertion of a flower easier, the invention should not be construed to be limited to that and the base can be designed in any shape suitable for holding the object to be displayed.

[0029]

Moreover, although the above embodiments are constituted in such a way that the poles and the shafts are crossing at right angles, it is also possible to make them cross each other at different angles as needed. For example,

the poles can be positioned to tilt slightly forward from the vertical line in case of an altar constituted according to the invention. In another example, a supporting device as shown in Fig. 18 can be used as well. It is shown in this figure that the through holes of the slider 5 are so arranged to allow the shaft 4 and the pole 3 to cross each other at an arbitrary angle and the supporting angle ω of the shaft 4 is made adjustable, so that the member-to-be supported 500 (e.g., a lamp) can be held in a wider range.

[0030]

Next, an embodiment where stands, sliders and poles with constitutions different from Fig. 1 and Fig. 5 will be described below.

Fig. 20 shows a module with such a structure. As shown in the figure, slanting frames 300 and 302 are arranged on the left and right sides of the stand and several shafts (305, etc.) are placed horizontally and in parallel to each other spaced between those frames. Sliders 309 are provided at desired positions on these multiple shafts to support the poles 312 and a base 310 is provided at the top end of each pole.

[0031]

A typical structure of the assembly of frames on said stand is shown in Fig. 21.

As shown in Fig. 21, a corner block 306 is used to assemble the slanting frame 300 with a horizontal frame 301 maintaining a desired angle between these frames, while a L-shaped corner block 307 is used to assemble the horizontal frame 301 with a vertical frame 303, all of which are solidly assembled with the use of the same members with those of clamping parts 610 described with reference to Fig. 15.

A shaft 313, on which a slider is mounted, and the slanted frame 300 are assembled with the use of a holder 308 shown in Fig. 21, so that the top surface of said shaft forms a horizontal plane.

[0032]

The detail structure of a slider 309 will be described referencing Fig. 22 through Fig. 24.

As shown in Fig. 22, the slider 309 in this embodiment comprises a detent-holding part 315 to hold a pole 312 by means of a detent engagement and an affixing part 314 to affix the slider to a desired horizontal position of the shaft 313. A stopper 322 provided on the detent-holding part 315 has the same construction and capability as the stopper 50 described with reference to Fig. 5. Multiple detent holes 316 are provided on the pole. The end 326 of the pole is provided with a constructional base identical to the one described with reference to Fig. 7, except that the base shown in Fig. 7

is mounted here upside down on the pole.

[0033]

Fig. 23 is a view of the slider shown in Fig. 22 seen from the direction P of the same. In this drawing, the slider is affixed to the desired position of the shaft by loosening a bolt 311 of the affixing part 314 to move the slider and retightening the bolt again after the move.

Fig. 24 is a cross-sectional view of the detent-holding part 315 along the chain line A-B shown in Fig. 23. As shown here, a pair of detent engagement balls 317 and 318 is contained in the detent-holding part 315 and these balls are pressed by means of springs 319 and 320 hard against the detent holes 316 formed on both sides of the slider to engage and maintain the pole. Although the slider is made of a plastic material, the balls in the detent-holding part 315 and inserts 321, containing a ball and a spring, are made of metal to ensure sufficient strength.

[0034]

Although the bolt clamping method is used as a means of affixing the slider at a desired position on the shaft in this embodiment, a detent mechanism can also be used as in the case of holding the pole. In such a case, a shaft having detent holes on both the top and bottom surfaces and the affixing part 314 is equipped with a detent mechanism on both the top and bottom side across the shaft similar to said detent-holding part

315. The slider can be securely held by means of the detent engagement from both the top and bottom side of the shaft. This will make the position adjustment easier than in the case of using the bolt clamping method.

[0035]

Next, the construction of the base mounting area at the end 326 of the pole will be described in detail referring to a cross sectional view shown in Fig. 25. Being different from the embodiment shown in Fig. 7, the spherical surface of the end of the pole is abutting the inside of the pole receiving part 325 (see Fig. 22) directly without being fitted to said spherical member to hold the base in this embodiment. Fig. 22 shows a flower vase 323 and the same spherical member 210 as in Fig. 10 is fitted into the inside of the holding part of the base, into which this vase is inserted to be held in place.

[0036]

Although various embodiments are shown in the above, the invention is of course not limited to these embodiments. It is possible for a person skilled in the art to make various structural modifications to arrive at different embodiments within the range of the technological concepts of the invention, and it is obvious that those embodiments will not be excluded from the range of this invention.

[0037]

[Effect of the invention]

Using the exhibiting device of the invention, it is extremely easy to adjust the exhibit positions of individual exhibited items. It is also possible to adjust the directions of individual exhibited items when exhibiting a large number of exhibited items using the exhibiting device of this invention, and it is possible to express patterns more clearly when complicated expressive patterns are to be expressed with the exhibited items. It also makes the construction work at the exhibition site extremely simple when a large number of exhibits are exhibited by means of using the modularized exhibit device of this invention.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[Fig. 1]

A drawing showing an embodiment of the invention.

[Fig. 2]

An enlarged drawing of a slider used in the same embodiment.

[Fig. 3]

A cross sectional view of a shaft used in the same embodiment.

[Fig. 4]

A drawing showing another constitutional example of the

slider.

[Fig. 5]

A cross sectional view of a slider with another constitutional example.

[Fig. 6]

A cross sectional view of a shaft with another constitutional example.

[Fig. 7]

A drawing showing an actual constitution of the base used in the embodiments of the invention.

[Fig. 8]

A plan view of a base.

[Fig. 9]

A descriptive drawing of a holding part and a spherical member used in the base.

[Fig. 10]

A descriptive drawing of the flower vase holding condition at the holding part.

[Fig. 11]

A drawing showing the pole used in an embodiment of the invention.

[Fig. 12]

An enlarged drawing of the clamping area of the base used in the same embodiment.

[Fig. 13]

A drawing showing the layout pattern of the holding parts used in the same embodiment.

[Fig. 14]

A drawing showing the connecting member used in the same embodiment.

[Fig. 15]

A drawing describing the mounting member used in the same embodiment.

[Fig. 16]

A drawing showing an example of the module used in the same embodiment.

[Fig. 17]

A drawing showing a constitution of an example altar using the same module.

[Fig. 18]

A drawing showing another embodiment of the positioning member according to the invention.

[Fig. 19]

A cross sectional view of an embodiment of the invention.

[Fig. 20]

A drawing showing another embodiment of the invention.

[Fig. 21]

A drawing showing a frame assembly of said embodiment.

[Fig. 22]

A drawing showing a slider, a pole, a base, etc., used in the same embodiment.

[Fig. 23]

A drawing of the slider viewed from the side used in the same embodiment.

[Fig. 24]

A descriptive drawing for the detent mechanism inside the slider used in the same embodiment.

[Fig. 25]

A descriptive drawing of the base mounting condition at the end of the pole used in the same embodiment.

[Description of Symbols]

1	Stand
2	Base
3, 312	Pole
4, 313	Shaft
5, 309	Slider
6, 308	Mounting member
7, 323	Flower vase
10, 301	Frame

CLAIMS:

1. An exhibiting device exhibiting multiple exhibited items in a desired layout pattern, wherein:

said exhibiting device has such a structure that, assuming said desired layout pattern is divided into multiple segments, the exhibited items in each segment in a certain layout pattern are exhibited as a single module, wherein each of said modules consists of:

(1) a stand;

(2) a specified number of shafts mounted horizontally at a specified position at the upper end of said stand according to the layout pattern each segment is supposed to exhibit;

(3) a specified number of positioning devices to be inserted to specified positions of said shafts according to the layout pattern each segment is supposed to exhibit;

(4) poles to be inserted vertically into said specified number of positioning devices and held to heights according to the layout pattern, which each segment is supposed to exhibit; and

(5) holding devices that are mounted on the upper end of said poles to hold and exhibit exhibited items in the layout pattern that each segment is supposed to exhibit;

and,

each of said positioning devices comprises a setup/holding means that sets up and holds the position of the positioning device on said shaft and a detent mechanism that adjusts and holds the height of said pole.

2. The exhibiting device according to Claim 1, wherein each holding device has multiple holding parts, and said multiple holding parts form an array of multiple columns, where the holding parts that constitute each column maintain an offset positional relationship relative to adjacent columns, thus creating a staggered positional pattern of holding parts as a whole when multiple holding devices are densely placed.

3. The exhibiting device according to Claim 2, wherein

each holding part contains a spherical member that fits therein, while said spherical member has a through hole, into which a member being held is inserted to be held, and

said spherical member is constituted in such a way that it is rotatably fitted inside the holding part so that the holding direction of the member being held is adjustable.

4. The exhibiting device according to Claim 3, wherein

the size of the opening at the bottom of the through hole is smaller than the size of the opening at the top of the through hole.

5. The exhibiting device according to Claim 1, 2, 3 or 4, wherein

said holding device further comprised a pole receiving part to mount the holding device itself to the upper end of a pole, where said pole receiving part has a spherical member that fits therein; and

said spherical member having a through hole for supporting said holding device when the upper end of

said pole is inserted therein, wherein said spherical member is constituted in such a way that it is rotatably fitted inside the pole receiving part so that the supporting direction of the holding device is adjustable.

6. The exhibiting device according to Claim 1, 2, 3, 4 or 5, wherein said setup/holding means holds the positioning device at a desired position of the shaft by clamping the shaft by means of a clamping mechanism using a bolt.

7. The exhibiting device according to Claim 1, 2, 3, 4 or 5, wherein said setup/holding means has a detent mechanism, where the positioning device is held at a desired position on the shaft by means of said detent mechanism.