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(54) **BABY MOBILE**

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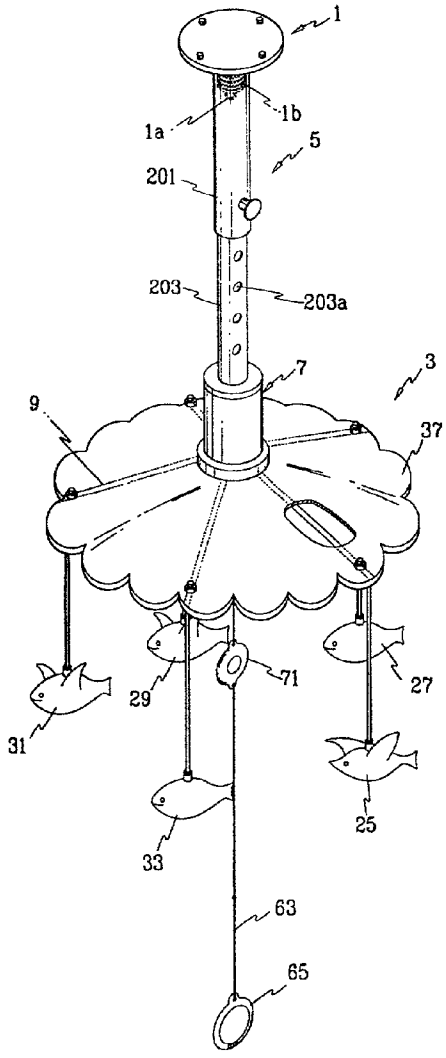
(52) **U.S. Cl.** **446/227**

(57) **ABSTRACT**

The Baby Mobile is a device with multiple functions that provides fascinating and engaging entertainment in addition to intellectual stimulation for an infant or child. It provides The Mobile provides stimulation and fun at the same time.



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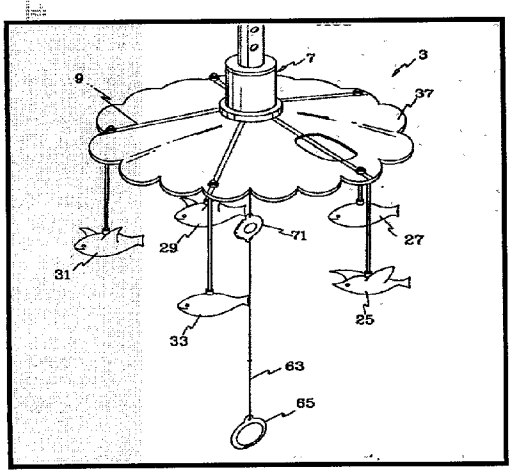
BABY MOBILE

1. ABSTRACT

The *BABY MOBILE* is a device with multiple functions that provides fascinating and engaging entertainment in addition to intellectual stimulation for an infant or child. It provides The *MOBILE* provides stimulation and fun at the same time.



The *BABY MOBILE* begins with the traditional child's mobile and adds several new twists. The *BABY MOBILE* rotates and suspends interesting and eye-catching objects (31, 33,25, etc.) from its canopy (3). This attracts the attention of the child observer immediately. As the child pulls the rattle ring (65), the canopy and the objects

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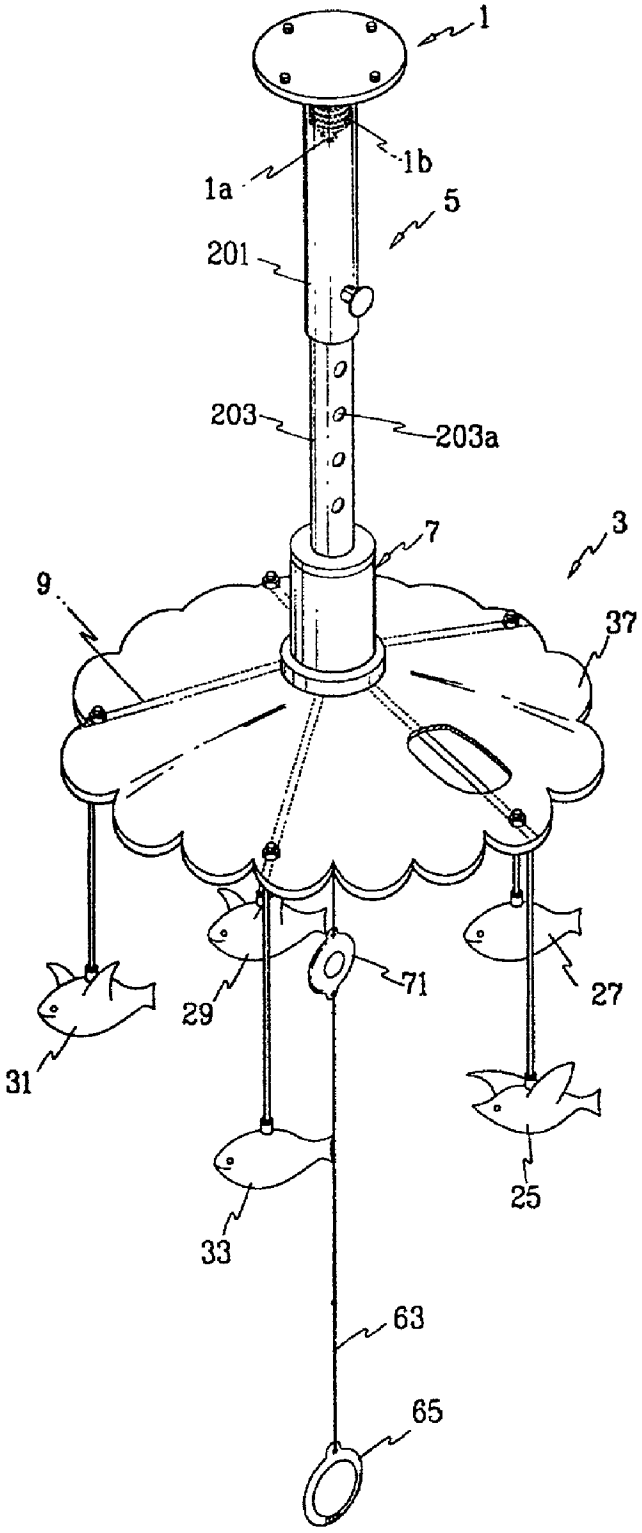
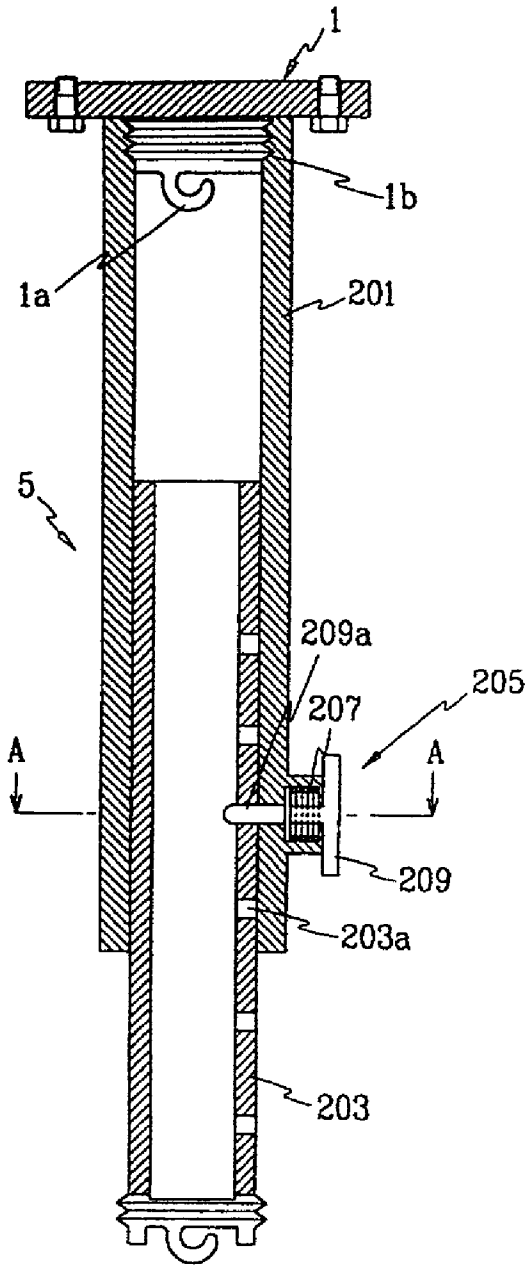


FIG/PLAN 1



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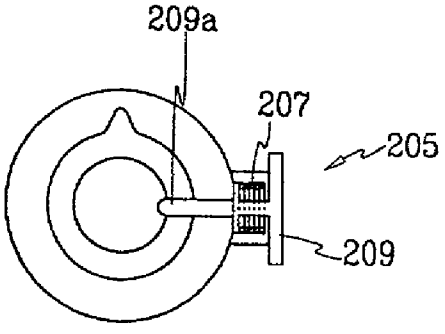

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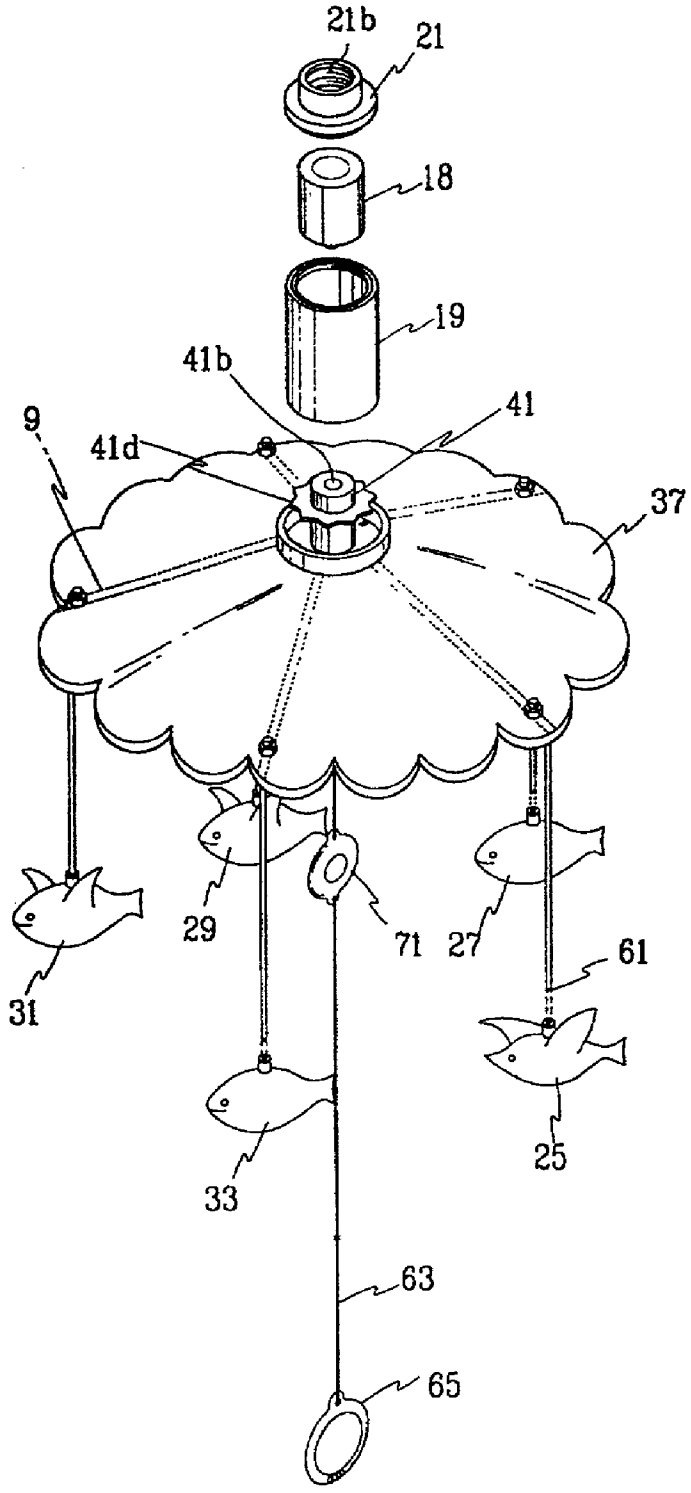

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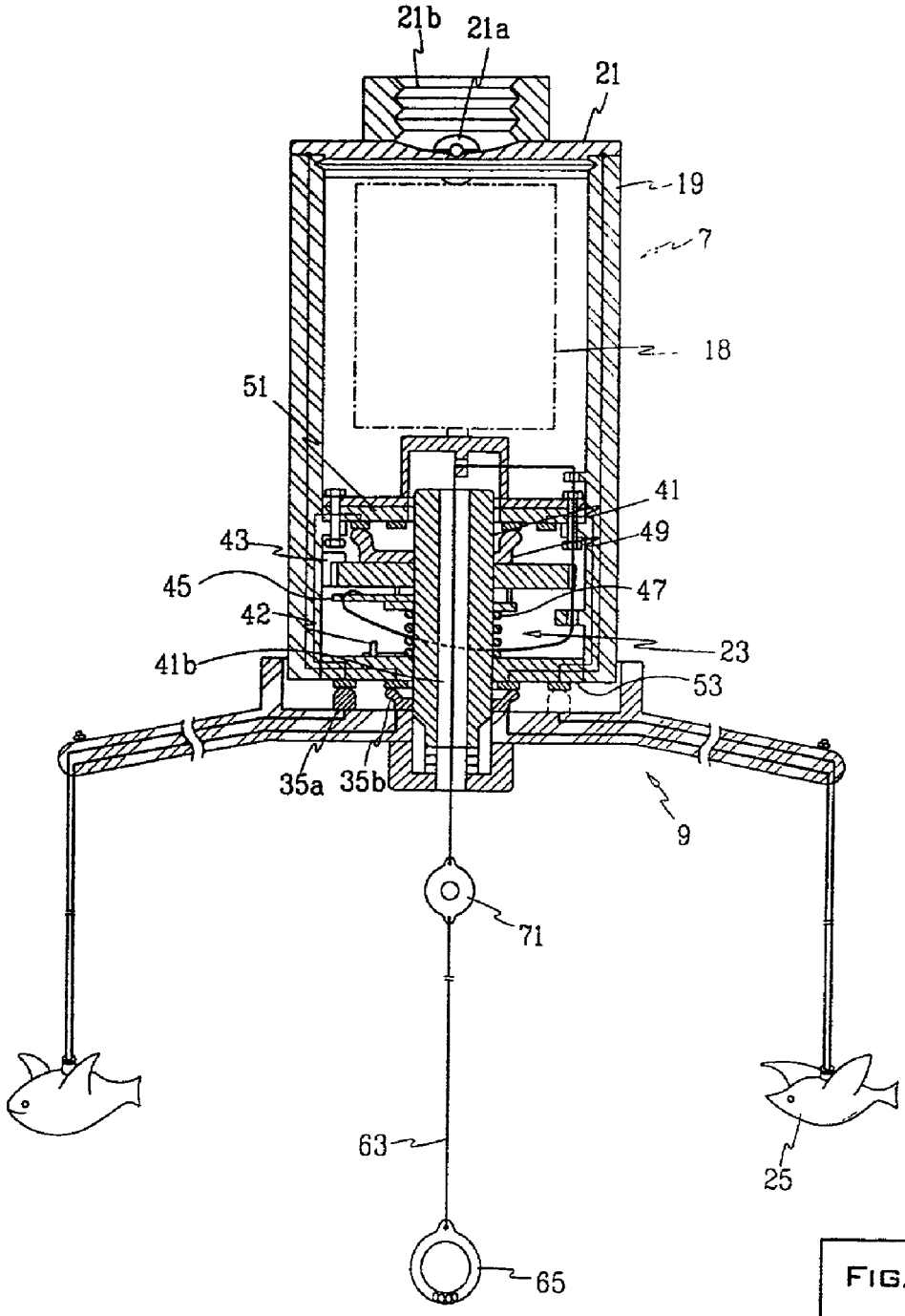

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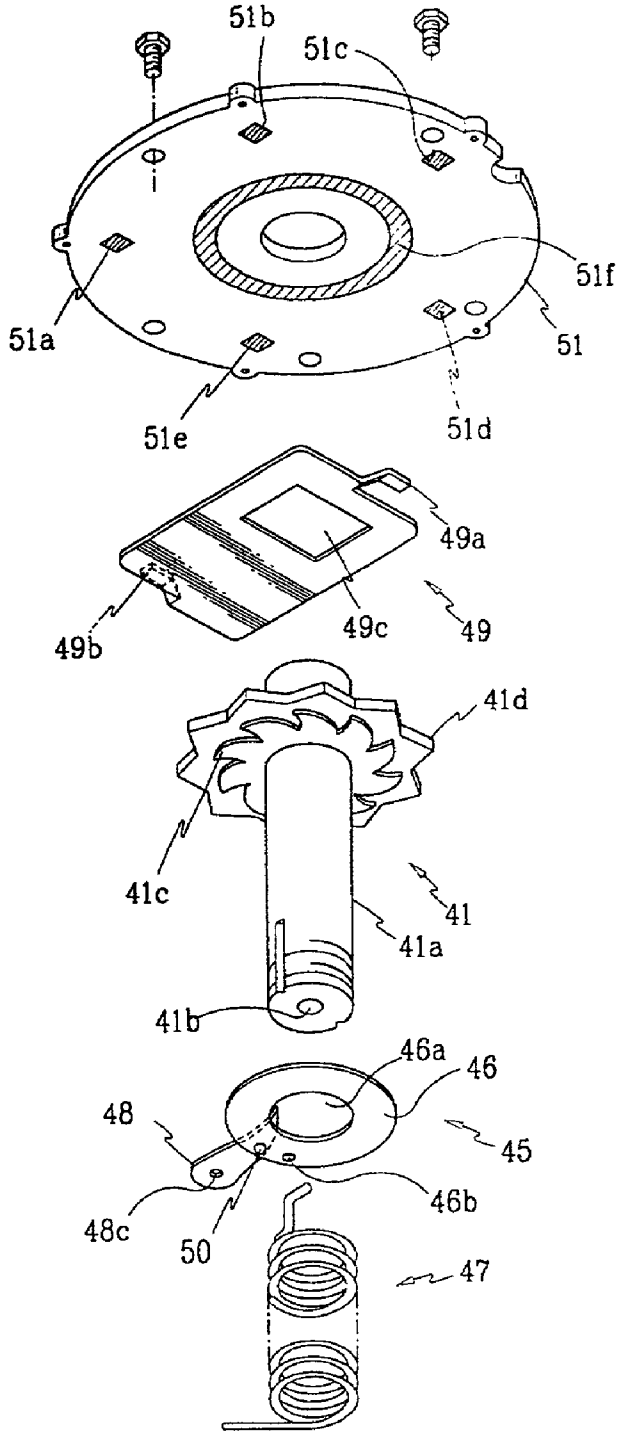
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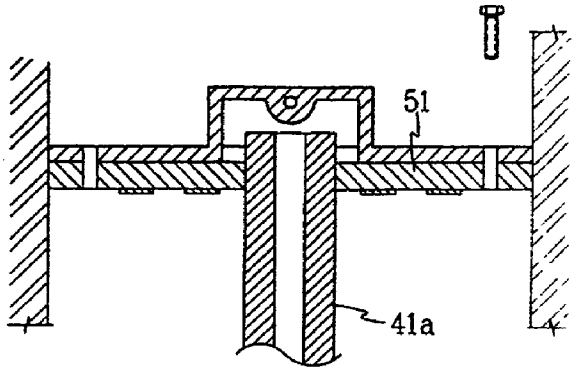
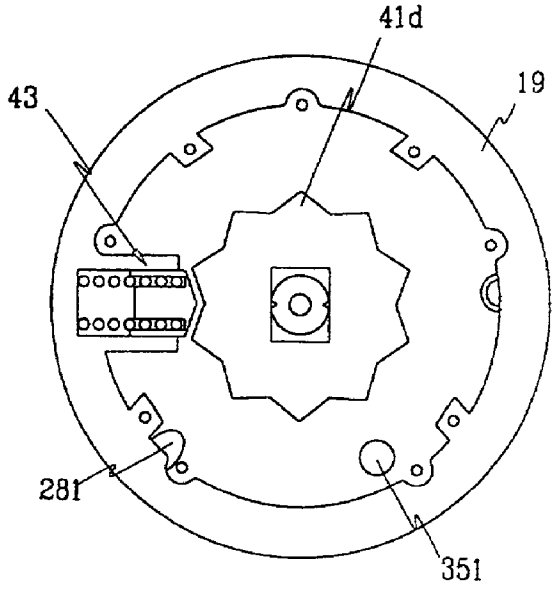
FIG/PLAN 6



FIG/PLAN 7



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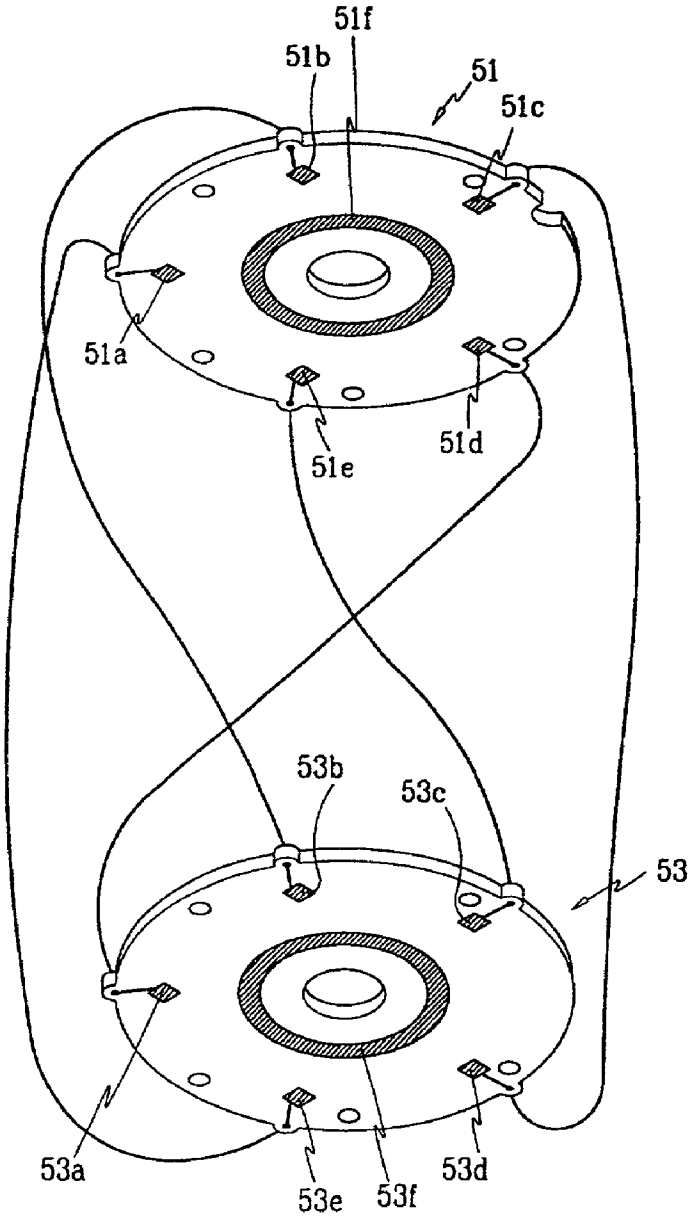

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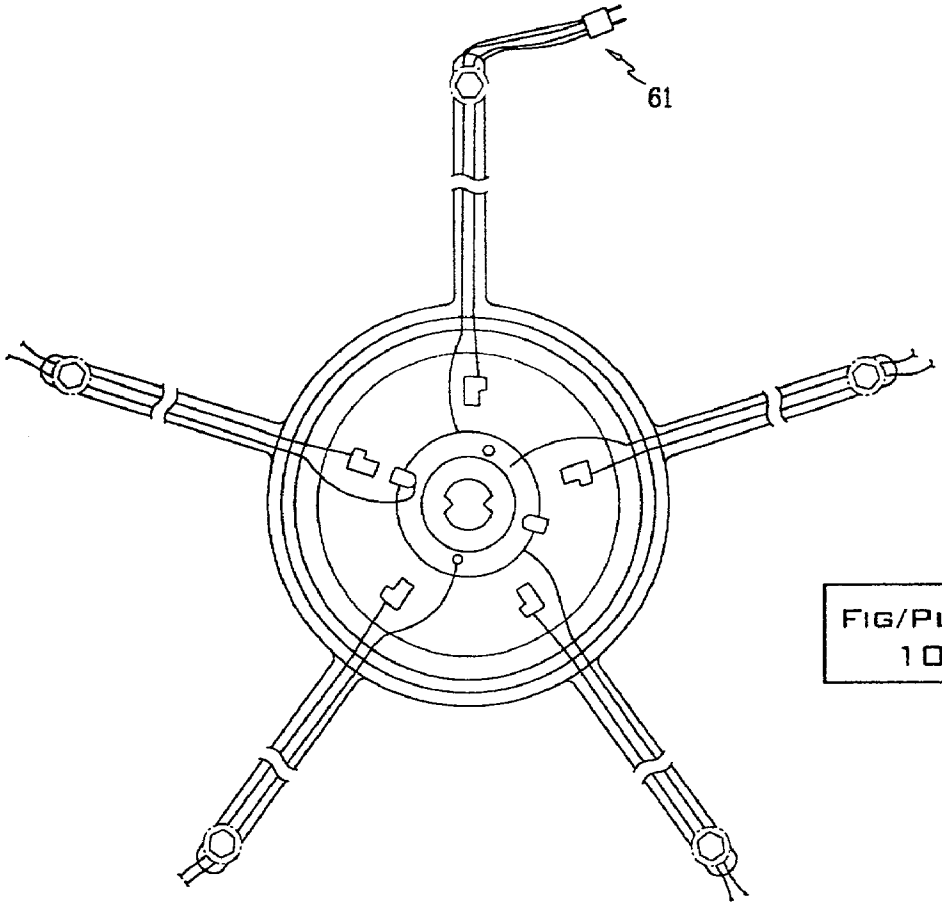

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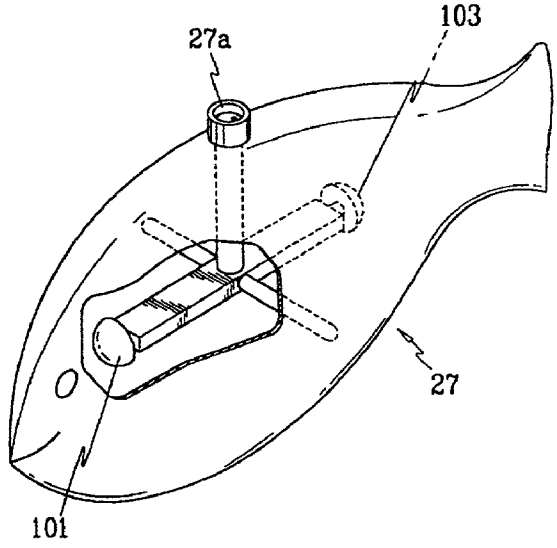

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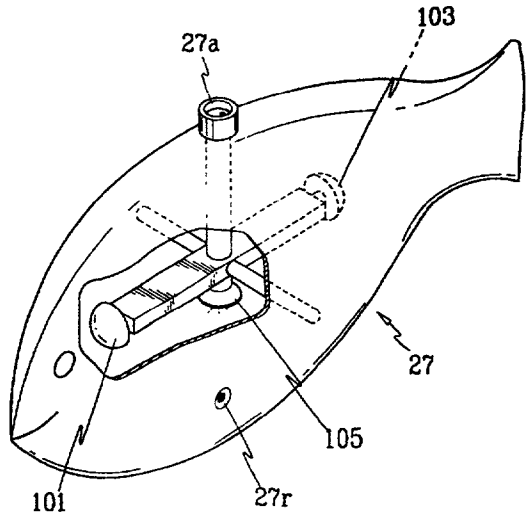

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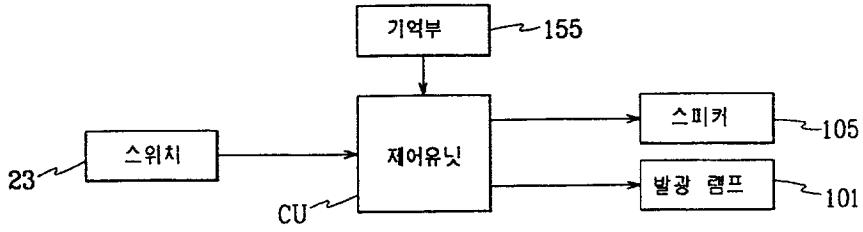

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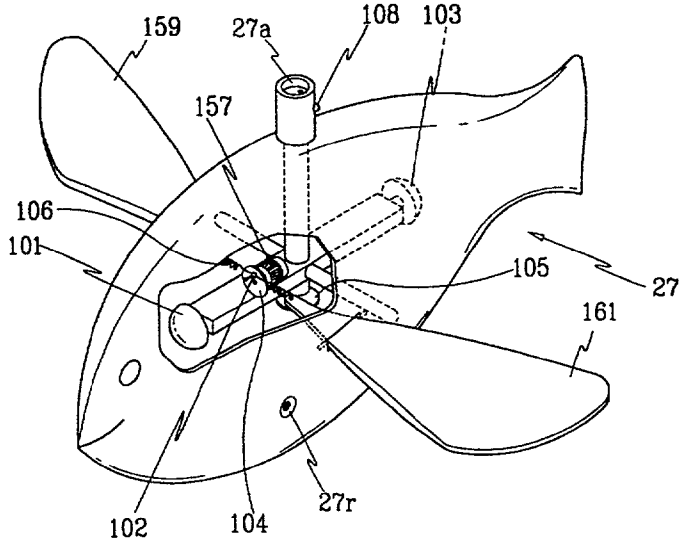

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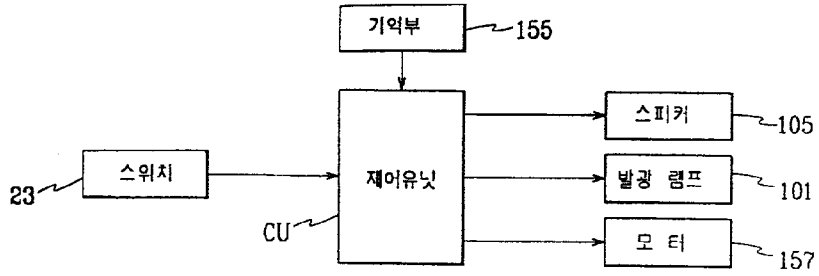
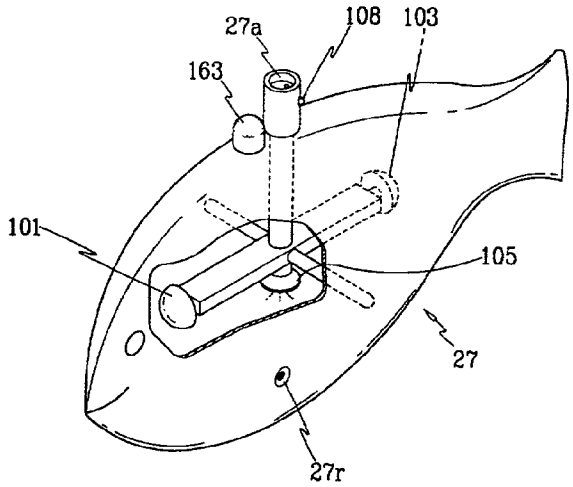


FIG/PLAN 15



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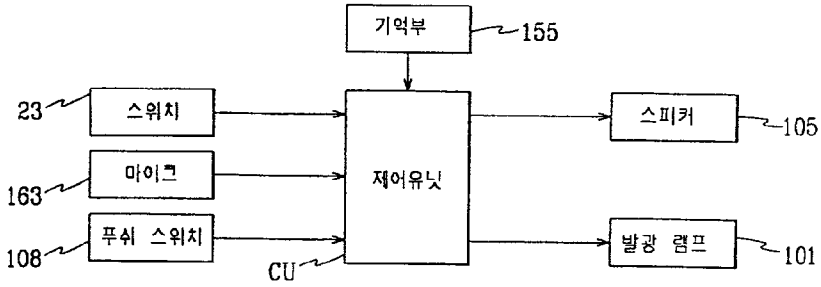

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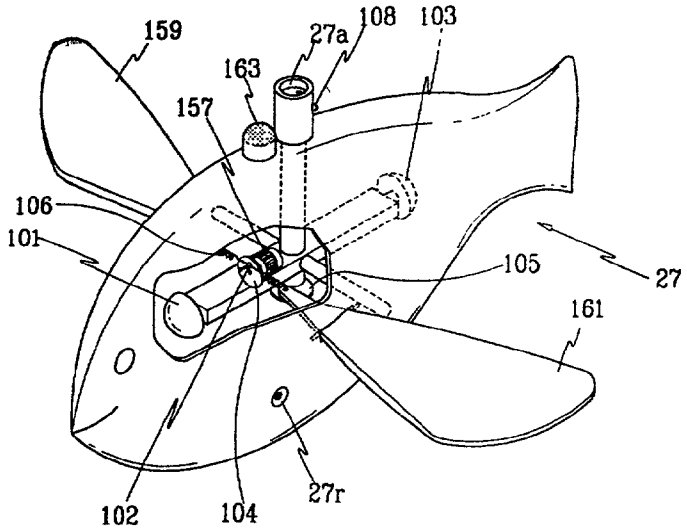

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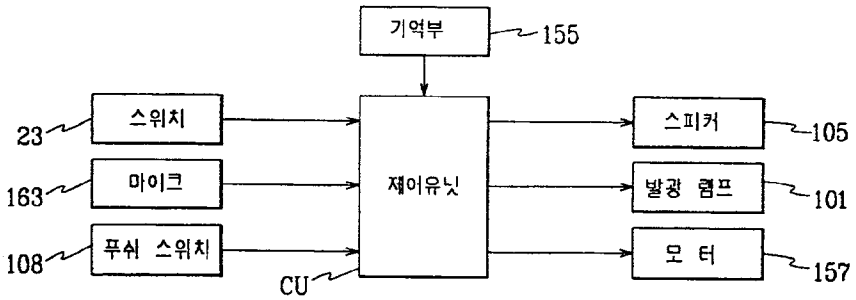

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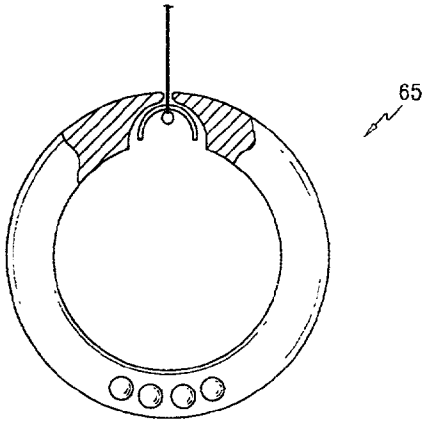

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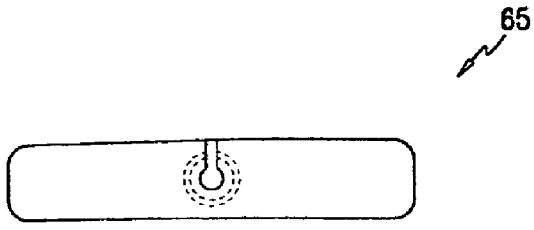

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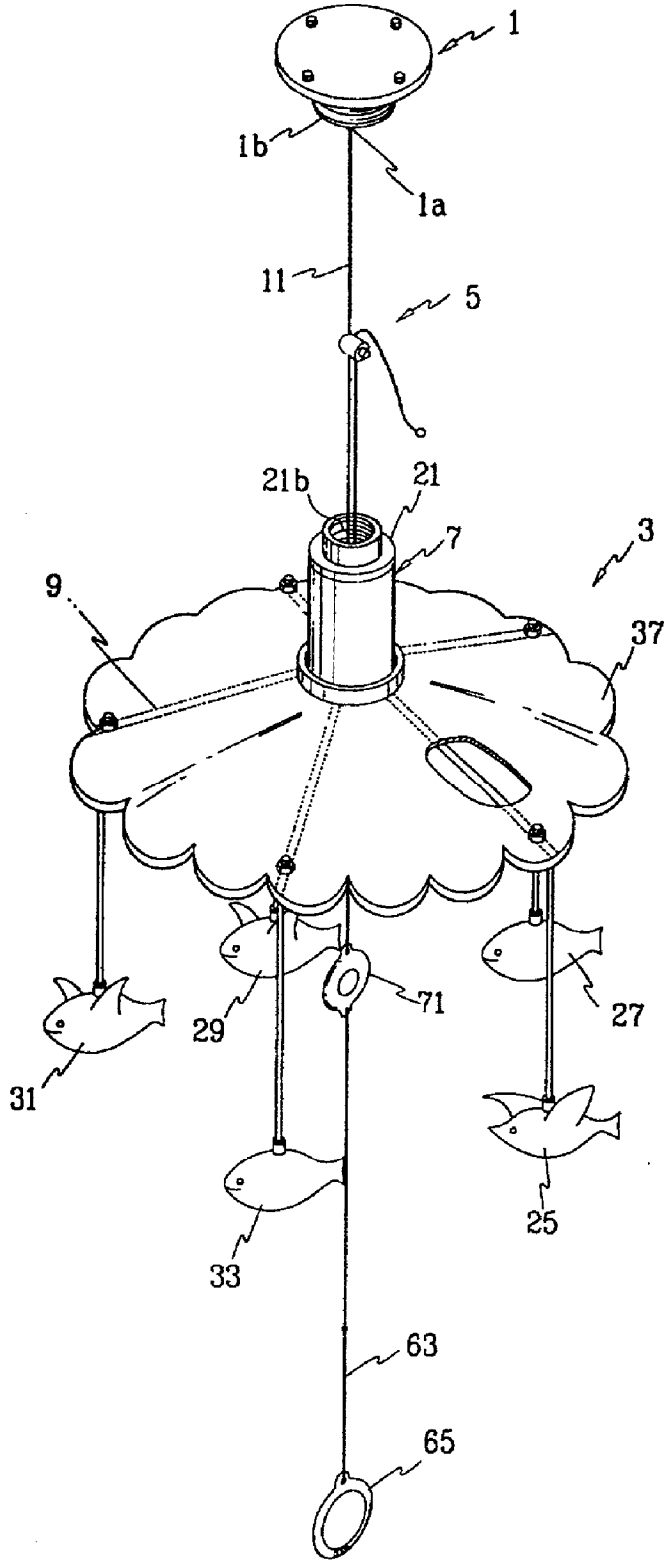

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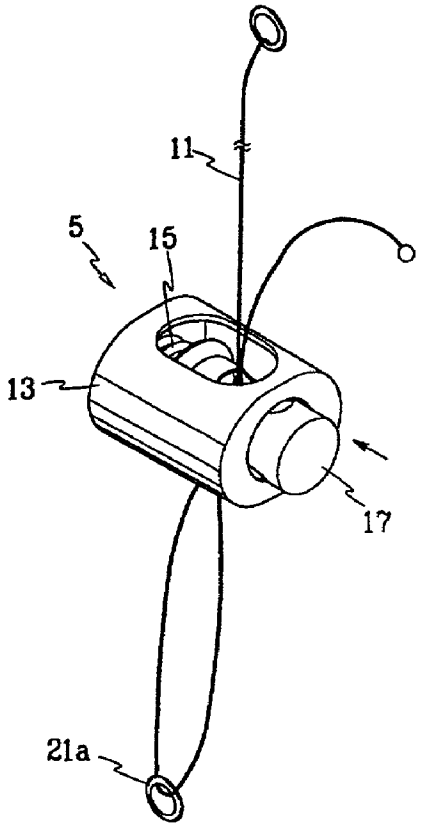

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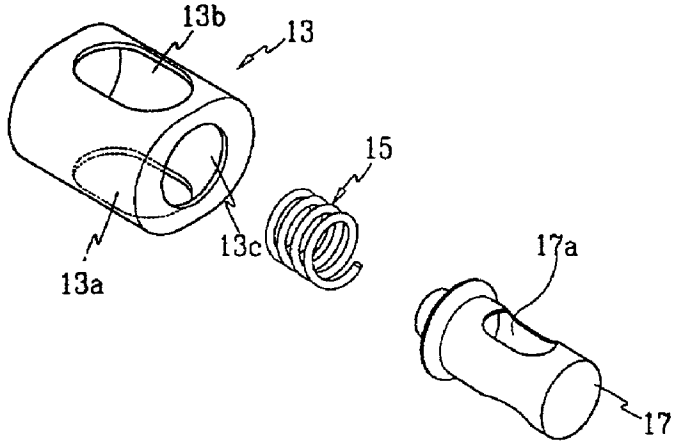

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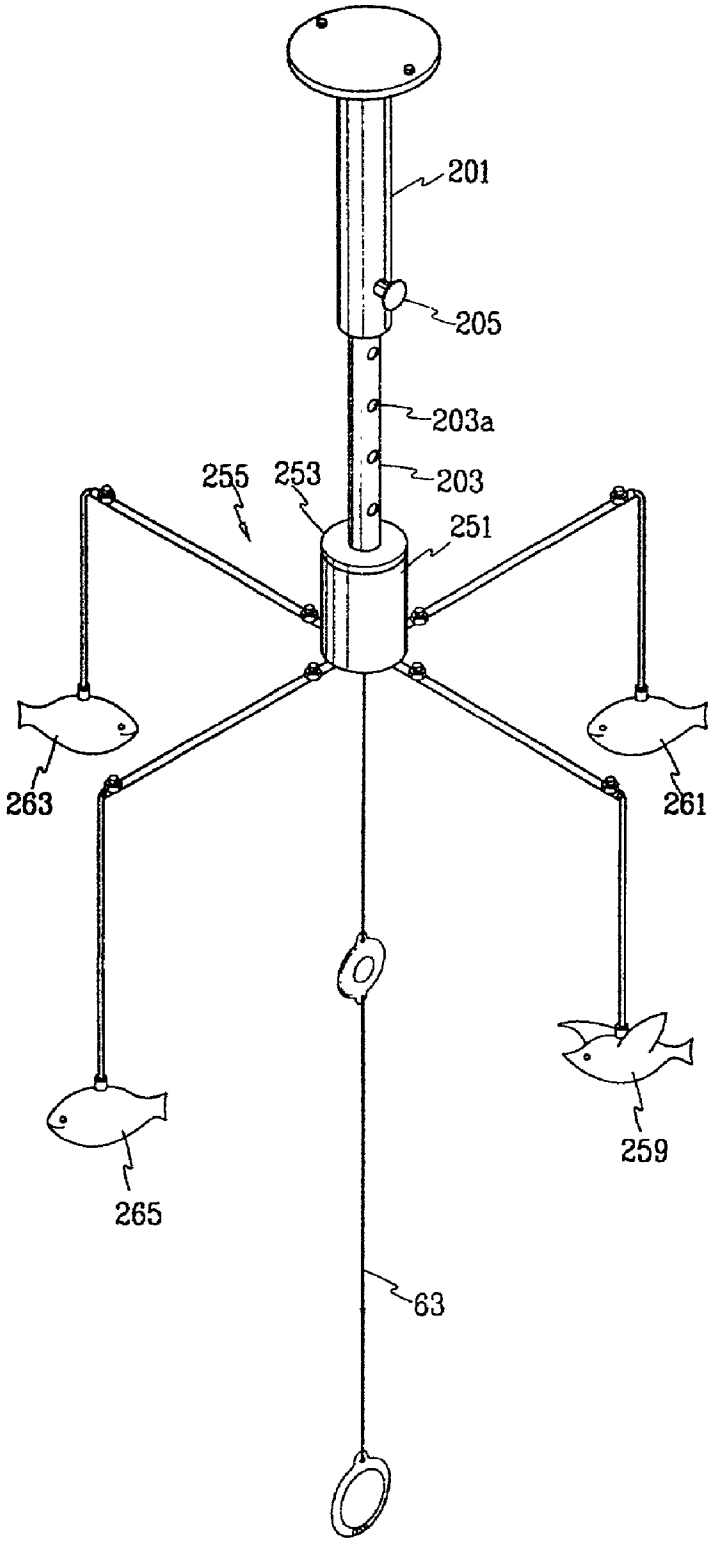
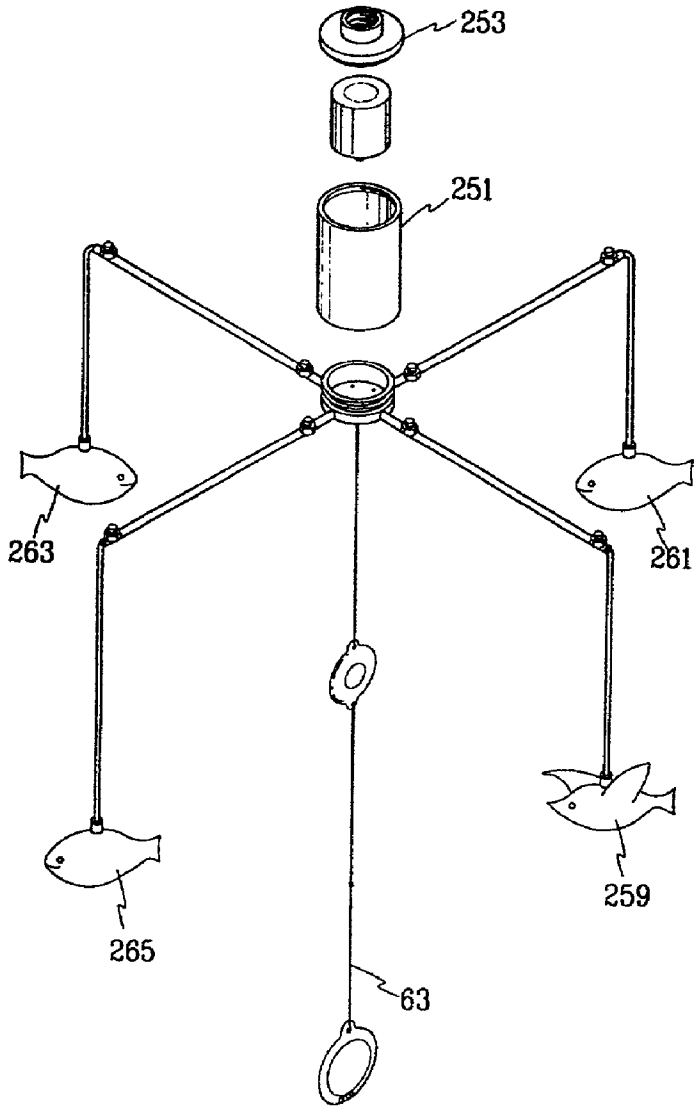
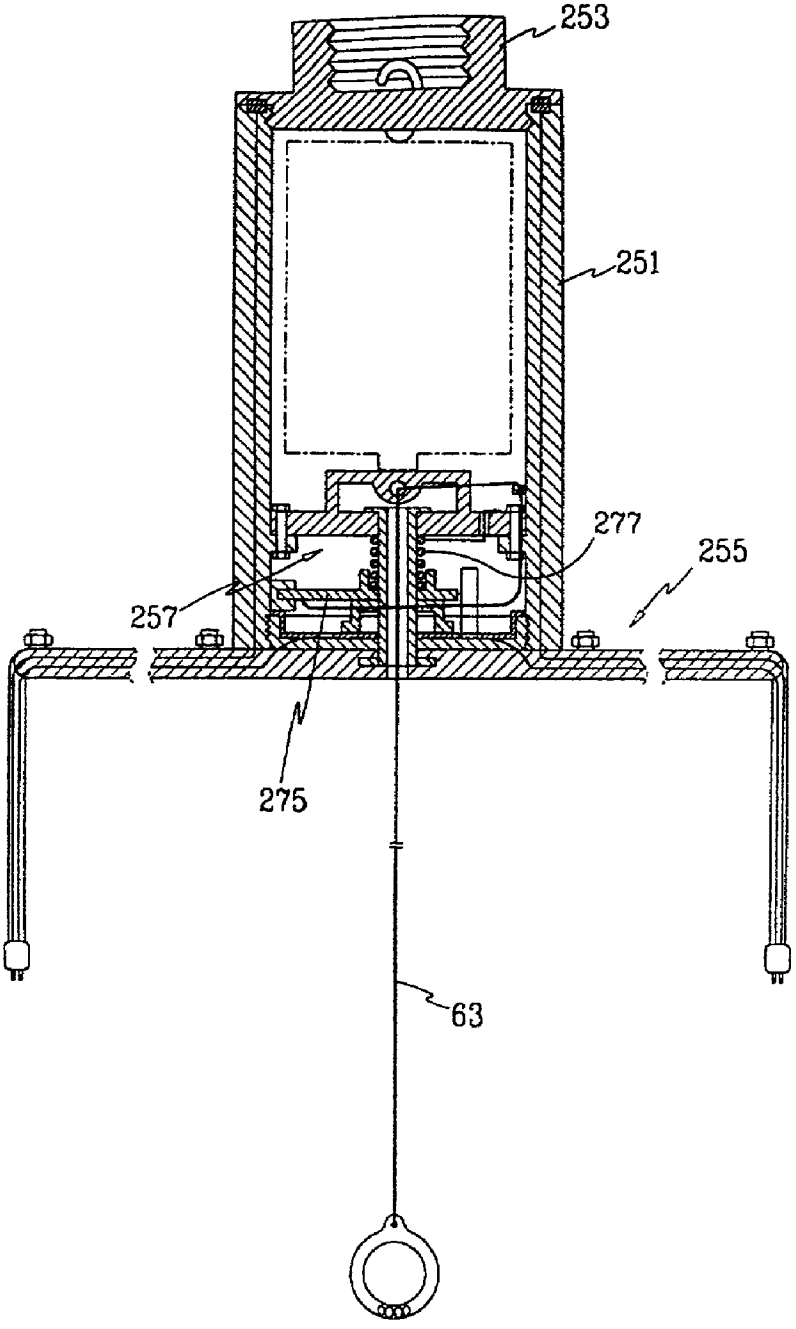


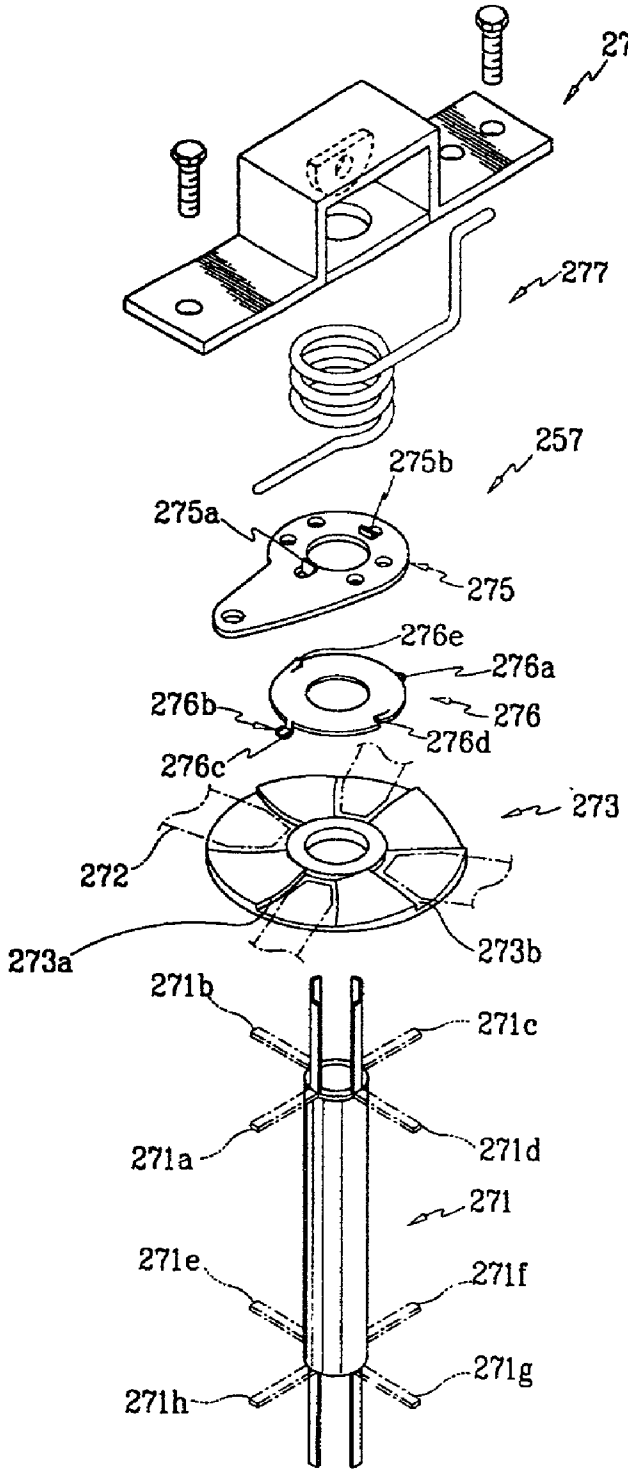
FIG/PLAN 25



FIG/PLAN 26



FIG/PLAN 27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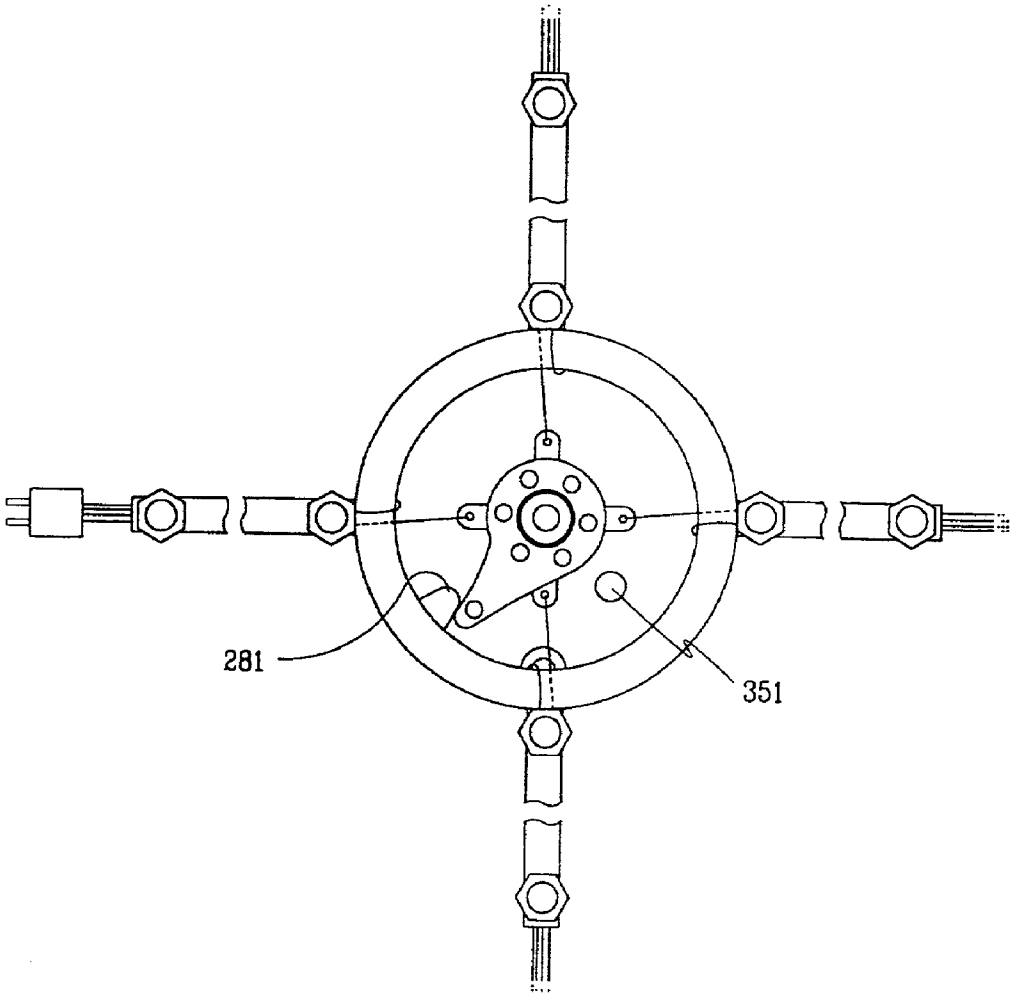
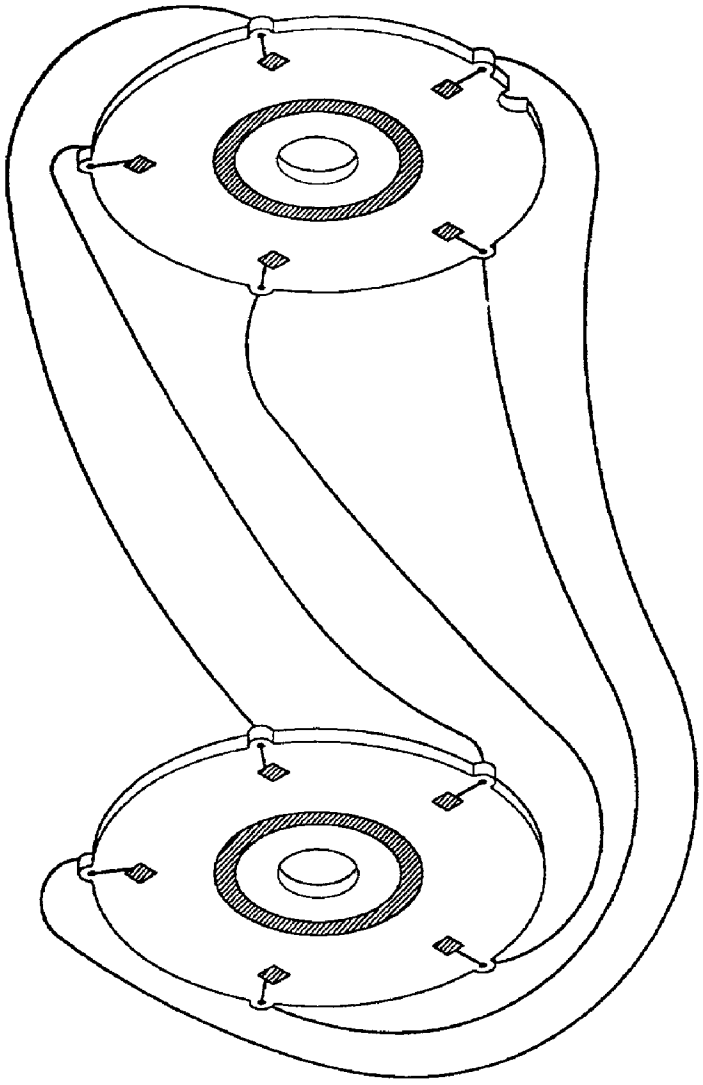
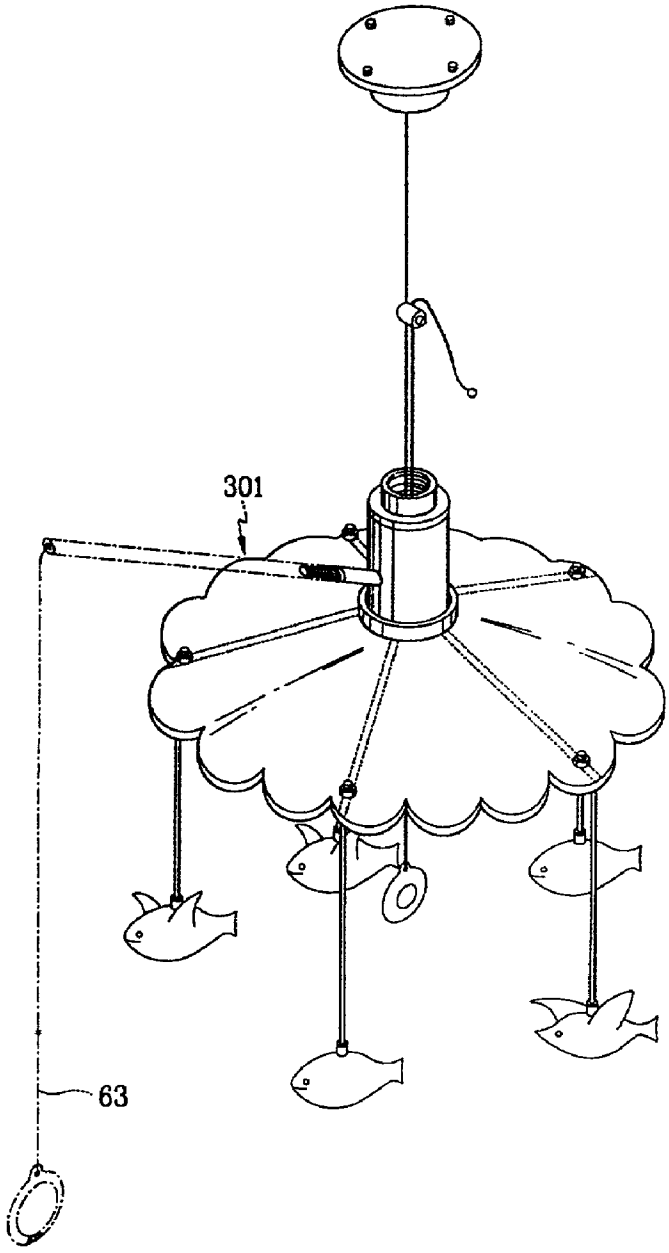
FIG/PLAN 28



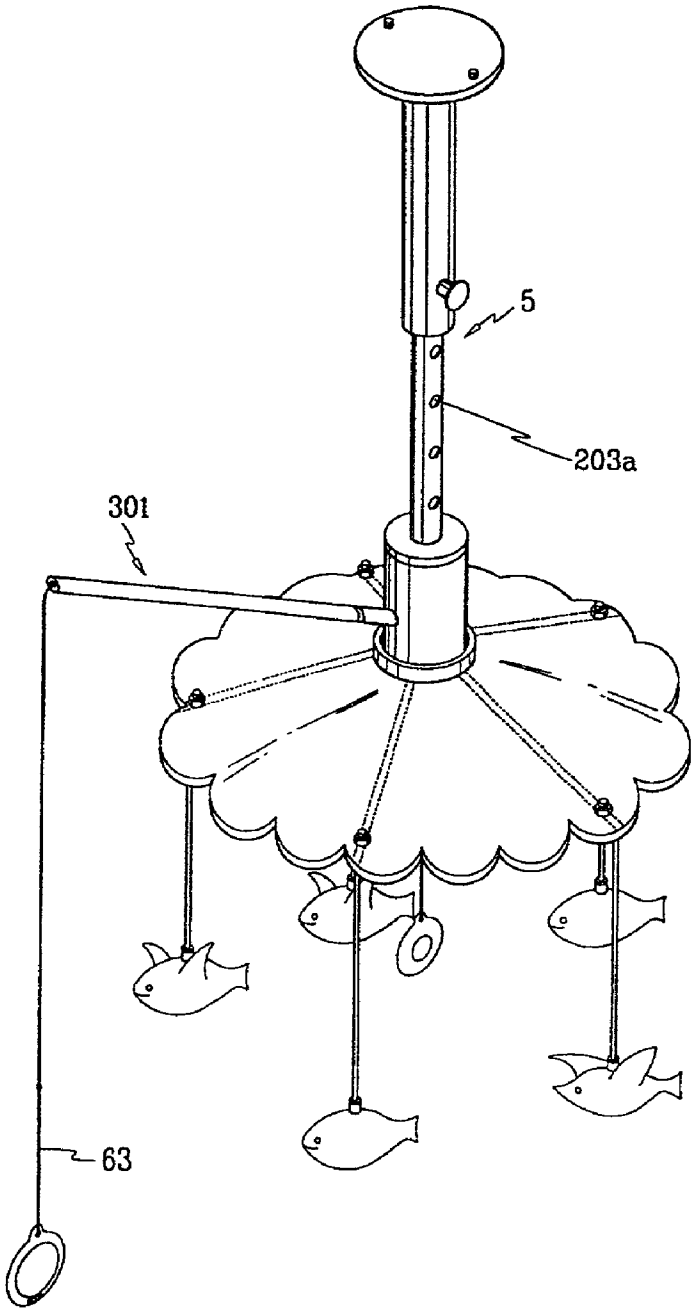
FIG/PLAN 29



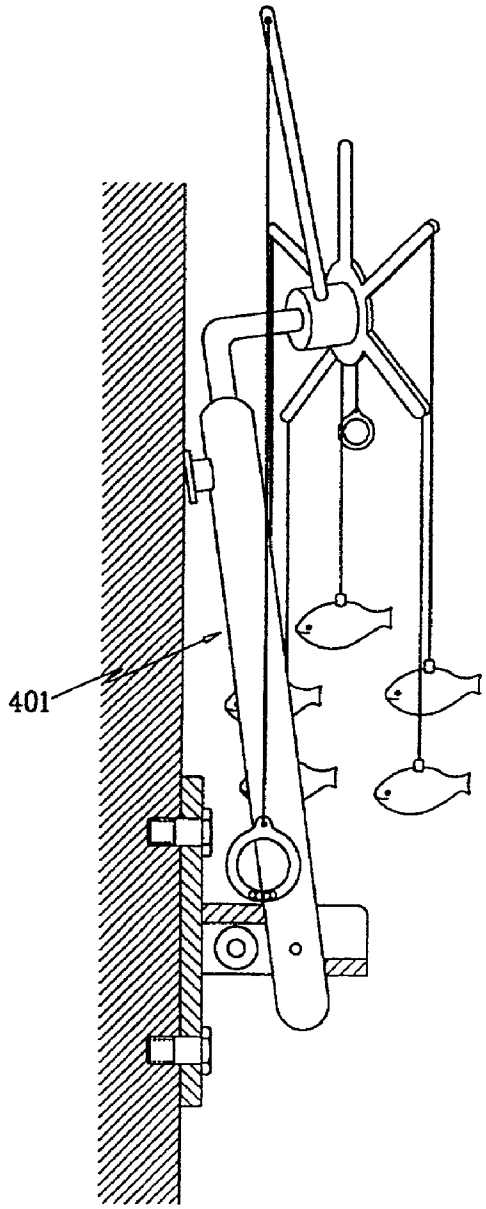
FIG/PLAN 30



FIG/PLAN 31

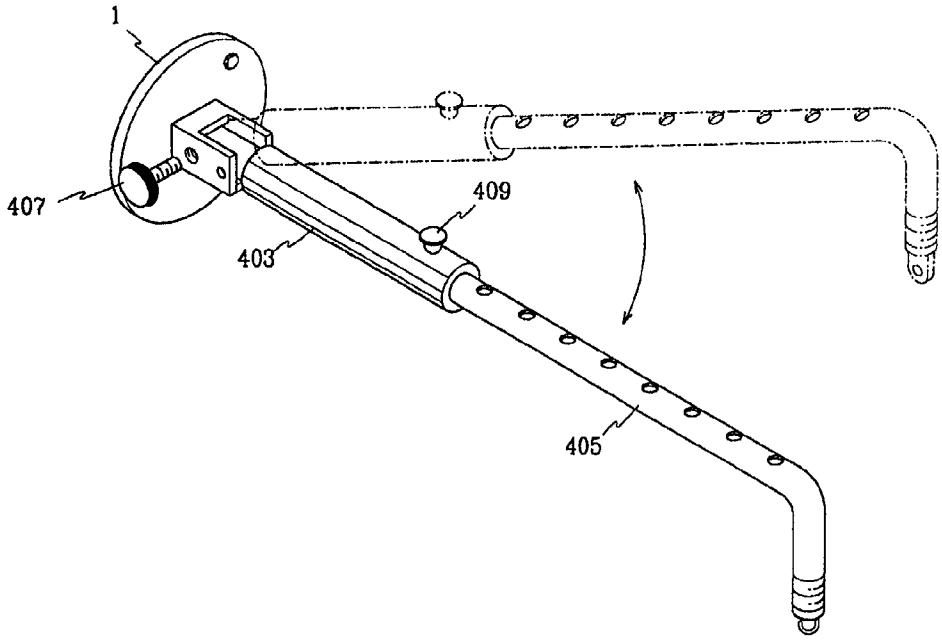


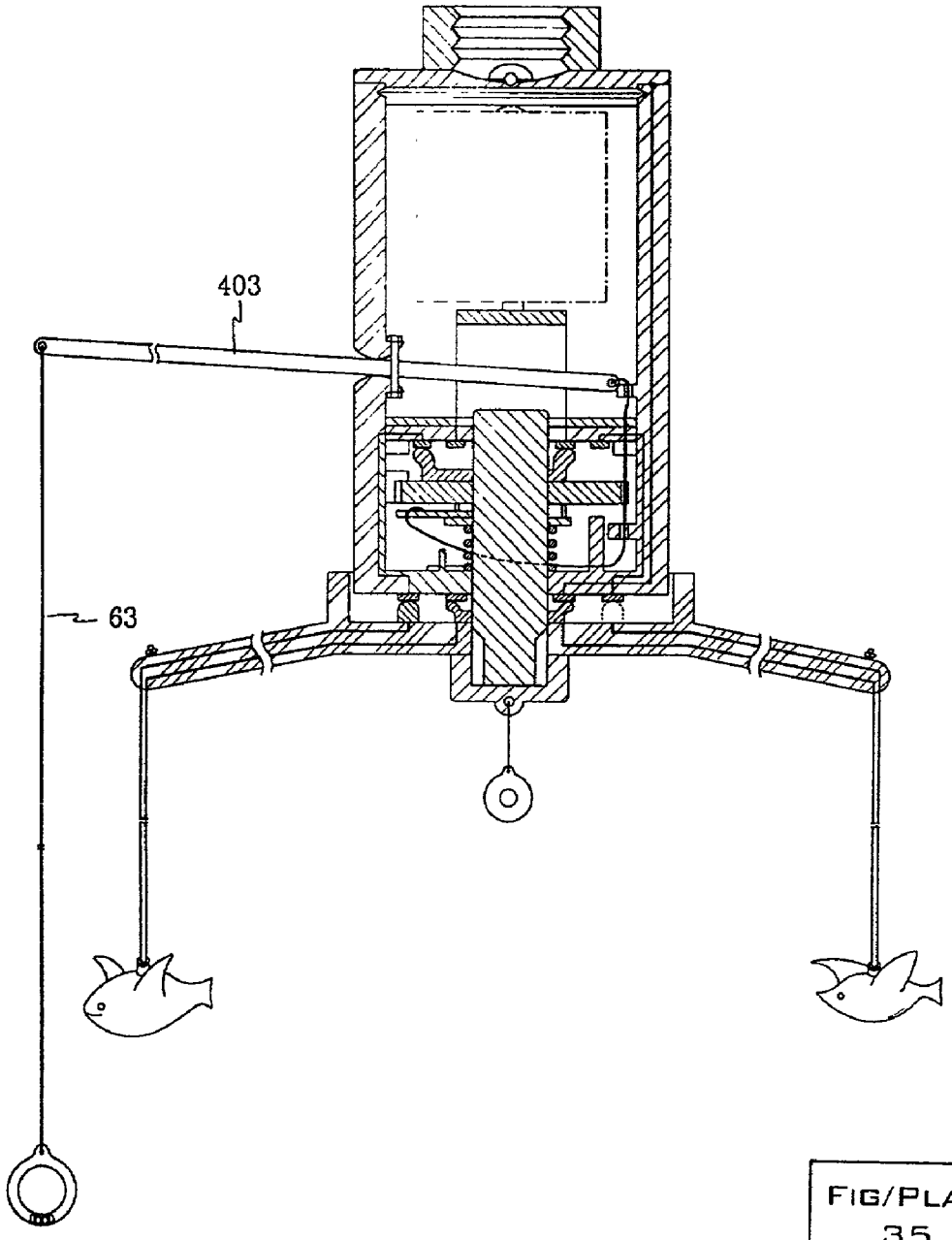
FIG/PLAN 32



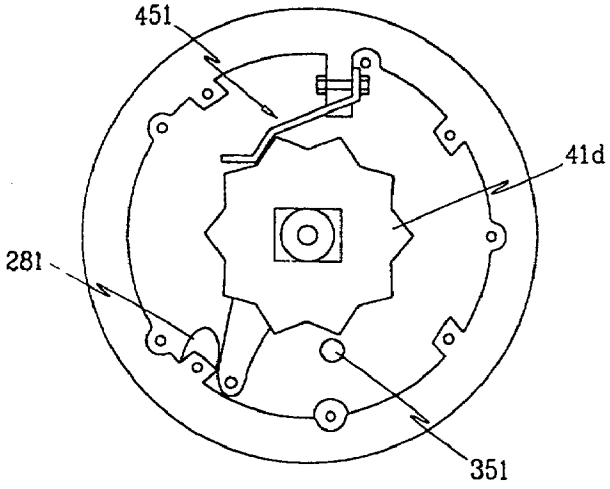
FIG/PLAN 33

FIG/PLAN 34





FIG/PLAN 35



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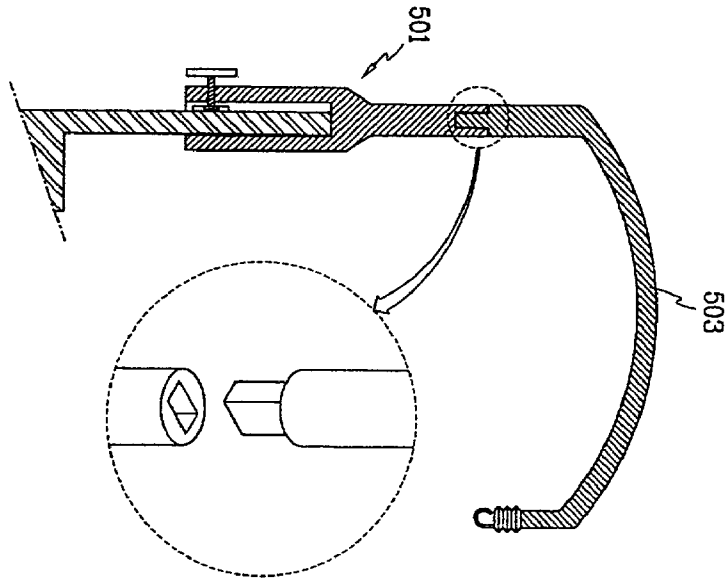

FIG/PLAN 37

BABY MOBILE

2. BACKGROUND

[0001] 1. Field of the Invention

[0002] This invention is a toy and is an intellectual and educational exercise for a child or infant.

[0003] 2. Description of the Prior Art

[0004] Research of metropolitan toy suppliers produces an abundance of mobile products that, while similar in concept, have few of the attributes of the Baby Mobile. The products found utilize a wind-up mechanism to rotate a set of suspended objects while playing a music box tune. By comparison, the Baby Mobile requires the child or someone to initiate the operation. It engages the child as each object produces a different and delightful effect for the observer. It is educational and stimulating as the child pulls the ring to cycle the next performance.

[0005] Research of recent patent databases indicates only a few inventions that might be comparable. U.S. Pat. Nos. 6113,455; 5,803,786; and 5,370,570. The Versatile Crib Mounted Mobile (U.S. Pat. No. 6,113,455) suspends a rotating light, a soft music player, figurines, a monitoring unit to detect audible signals, a timer and a control panel above the observer. Its suspended objects have no variable audio, internal lighting or moving parts. The Versatile Crib Mounted Mobile presents a completely different concept and utility from the Baby Mobile.

[0006] The Continuous Play Musical Mobile (U.S. Pat. No. 5,803,786) plays music from a player unit and has no suspended objects or other mobile qualities found in the Baby Mobile. The Continuous Play Musical Mobile simply plays music and does not have the rotation or other features found in the Baby Mobile.

[0007] The Portable Mobile (U.S. Pat. No. 5,370,570) represents a classic mobile with a versatile mount. It suspends objects from an umbrella that rotates but has nothing of the sound, light, or internal movement in the suspended objects as the Baby Mobile does.

[0008] Other patents were reviewed but have few similarities and none incorporate the many features and the level of engagement or interaction found in the Baby Mobile.

Foreign Patent Preference

[0009] The Baby Mobile is currently patented in the Republic of Korea (South Korea) through the Korean Industrial Property Office. Attached is the patent documentation.

[0010] The Baby Mobile was submitted in two versions. The first was submitted on May 18, 2000 and awarded patents 26849 and 26850. The second version (a slightly improved version) was submitted on Aug. 21, 2000 and was awarded patent 48412. The second improved model will be the focus of this application with only passing some reference to the earlier materials. The materials were first submitted on May 18, 2000 and that is the date the foreign patent preference is asked for.

3. OBJECTIVES AND SUMMARY OF INVENTION

[0011] The Baby Mobile provides entertainment, enjoyment and intellectual/educational stimulation for babies and children alike. First, most baby mobiles have limited mounting applications and those with pull ring operations are limited by mounting and suspension hardware that is insufficient. The Baby Mobile can be mounted securely to a wall, ceiling or can be mounted by a clamp on a crib rail or other secure railing to be best viewed. The mount is sufficient to withstand the rotation of the canopy and the tug on the pull ring. In addition, the Baby Mobile has several mounting methods giving the owner the ability to choose the best for the situation.

[0012] Second, most mobile products merely rotate objects around and may play some kind of musical tune. The objects are limited to an opaque surface with colors painted on. The music is usually limited to simple prepackaged materials. The Baby Mobile provides much more variety and attractive objects. The objects include fish, birds and flying fish and the only limit is the imagination. The pull ring will rotate the canopy ⅕th and rotate one object onto the electrical contacts supplying current from the central battery in the chassis body. The object making contact then begins its pre-programed performance.

[0013] Each object suspended from the canopy has a chip Control Unit (CU) with a memory module to control the different internal parts of the object. The first is the simplest, with internal lights that come on or blink. The next adds to the lighting by playing one of several pre-programed audio files like a lullaby track, a nursery rhyme, the sounds of the object (for a bird, a birdsong, etc.), the ocean sounds or any number of pre-recorded audio file possibilities. Another adds to the lighting by playing audio files created by the owners that might include the voices of the parents with soothing words, a favorite family song or perhaps a recording of the child's own voice. This could be re-recorded with new materials as desired. The last variation includes the lights and audio playback option and adds movement in the form of fluttering wings for the flying fish or the bird for example. There can be many object forms from bears, to birds and from fish to doll forms. The only limit is the imagination but the key is the internal workings of the objects. All these are far more engaging and stimulating than rotating ornaments found on most baby mobiles.

[0014] Most mobiles currently available have the same suspended ornaments or figurines and a child tires of them soon. The Baby Mobile suspended objects can be changed so when one object becomes uninteresting, it can be replaced with a new one with different features. The interaction and interest is maintained because there is one active object at a time and each one is different and new ones can replace the older ones at the connector plug. To further the variation, some objects have internal recording capacity on the CU and the owner can replace the recorded audio with new and different audio, keeping interest high.

[0015] The construction of the Baby Mobile is inexpensive compared to many 'high tech' toys. The use of one central battery saves on cost and on the weight of the assembly. In addition the Baby Mobile has various mounting features. It can be mounted on a ceiling or wall or on the railing of a crib or other piece of secure furniture. The height can be adjusted easily on each mounting variation.

[0016] Each time the child or someone pulls the ring, a different object becomes active. Once the activity is done, the child merely pulls the ring again and a new object rotates

onto the electrical contacts to begin its sequence. The ring has a rattle on it and there is another music player above the ring that can be squeezed to activate. The Baby Mobile activity involves the child so it is not only entertaining, it is a learning experience full of intellectual stimulation for the child.

4. DISCUSSION OF THE INVENTION

Description of Illustrations

[0017] The illustrations and drawings are included from the materials second version of the Baby Mobile as submitted to the Korean Industrial Property Office. Not all drawings and illustrations will be addressed as many are self explanatory.

[0018] Plan 1: Simplified illustration of the Baby Mobile

[0019] Plan 2: Adjustable ceiling mounting bracket

[0020] Plan 3: Section of secure pin

[0021] Plan 4: Illustration of Plan 1 and chassis case

[0022] Plan 5: Baby Mobile full cross section

[0023] Plan 6: Exploded detail of switch device

[0024] Plan 7: Cross section of upper electrical contact plate

[0025] Plan 8: Detail of detent and stopper mechanism

[0026] Plan 9: Detail of upper and lower electrical contact plates

[0027] Plan 10: Plan view of canopy and electrical circuitry

[0028] Plan 11: Detail of suspended object with electrical devices—lights

[0029] Plan 12: Detail of suspended object with electrical devices—lights and speaker

[0030] Plan 13: Block diagram of electrical circuit of Plan 11 & 12

[0031] Plan 14: Detail of suspended object with electrical devices—lights, speaker and motor for wings

[0032] Plan 15: Block diagram of electrical circuit of Plan 14

[0033] Plan 16: Detail of suspended object with electrical devices—lights and microphone

[0034] Plan 17: Block diagram of electrical circuit of Plan 16

[0035] Plan 18: Detail of suspended object with electrical devices—lights, speaker, motor for wings and microphone

[0036] Plan 19: Block diagram of electrical circuit of Plan 18

[0037] Plan 20: Detail of activity/rattle ring

[0038] Plan 21: Illustration of level

[0039] Plan 22: Illustration of variable elevation mounting system

[0040] Plan 23: Detail of brake device

[0041] Plan 24: Exploded diagram of brake device

[0042] Plan 25: Plan of Baby Mobile without canopy and 4 suspended objects

[0043] Plan 26: Exploded diagram of Plan 25

[0044] Plan 27: Section of first variation of switching device and chassis case

[0045] Plan 28: Exploded diagram of Plan 27

[0046] Plan 29: Detail of detent, rotation mechanism and electrical connections to suspended objects

[0047] Plan 30: Detail of upper and lower contact plates with 4 connection points

[0048] Plan 31: Illustration of alternative pull ring mechanism and variable elevation mounting system

[0049] Plan 32: Illustration of alternative pull ring mechanism and adjustable ceiling mount bracket

[0050] Plan 33: Illustration of alternative wall mounting bracket in storage position

[0051] Plan 34: Detail of wall mounting bracket

[0052] Plan 35: Cross section of alternative pull ring mechanism, switching and contact point plates and chassis case

[0053] Plan 36: Detail of alternative design for Plan 3

[0054] Plan 37: Cross section of alternative railing mounting bracket

DETAILED DISCUSSION OF THE INVENTION

[0055] Referring to the illustrations and plans in further detail:

[0056] Plan 1: This shows the Baby Mobile in perspective with the ceiling adjustable mounting bracket. The ceiling bracket is fully adjustable to achieve the best viewing angle for the child. The plan shows the chassis case **(7)** that houses the central battery, the rotation device and the upper and lower electrical contact plates. The canopy **(37)** is plastic and can be painted with bright colors and designs or transparent with a variety of patterns and textures in the canopy for interest. The rotation device is controlled by the pull ring **(65)** that also has a squeeze panel **(71)** for extra sound interaction.

[0057] The canopy **(37)** can be plastic or cloth with pleasing textures and colors. The canopy makes the electrical contact and moves the current down the suspension arms **(9)** through conductors that connect to each suspended object **(31, 33, 25, 27, 29)**. The objects can be made in a variety of familiar shapes to provide pleasing interaction for the child observer.

[0058] The ring **(65)** has a rattle portion that makes noise each time the child handles it. The pressure device **(17)** allows the child to squeeze it and it plays a child's song. This is the general appearance of the Baby Mobile.

[0059] Plan 2 & 3: This shows the details of the ceiling adjustable mounting bracket.

[0060] Plan 4: This exploded illustration shows the battery (18) that is housed in the chassis case (19) and is secured by the case cover (21). The case cover has a hook that can be used for alternative mounting methods to be shown later. The rotation mechanism (41) is shown coming through the canopy (37).

[0061] The support arms with the electrical suspension wires (9) connect to each suspended objects by a plug (61). The electrical plug secures the suspended objects to the Baby Mobile and conducts the battery power to the object.

[0062] Plan 5: This cross section shows the internal materials and connections of the Baby Mobile. The chassis case (19) and the battery (18) is shown. The bull ring (65) with its cord connects to the rotation device (23) to rotate the canopy (9). The electrical connection is shown through the pointed contact connection device (49) that connects the electrical contact points to conduct the current to the lower chassis cover (53) to make contact with the canopy contact points (35*a* and 35*b*). Once the contact points align as shown, the current will flow to the suspended object (flying fish).

[0063] Plan 6: The exploded diagram shows the upper contact point plate (51) and the circuitry that connects by upper rotating contact plate (49). The current will pass down to the suspended objects.

[0064] The rotation gear device (41) is a multi-purpose implement that ratchets a ⅕th turn for each pull of the activity/rattle pull. In addition, the upper end of the rotation gear device is squared to turn the upper rotating contact plate (49) to complete is a circuit to one suspended object at a time.

[0065] The spring (50) allows the detent (48) and the ring retainer (46) to rotate the rotation gear using the curved teeth (41*c*) as the activity/rattle pull is pulled. The rotation gear is moved in one direction only because of the ratchet character of the movement. The spring is secured (46*b*) so it will return the detent to its initial position and can engage the rotation gear for the next movement.

[0066] Plan 7: A cross section of the upper contact point plate (51).

[0067] Plan 8: A plan of the rotation gear device (41) and how it is kept in position to keep the circuit established using a tooth stop (43) that is mounted on a resilient base to allow the rotation gear device to rotate while holding it in position between rotations.

[0068] Plan 9 & 10: The contact points (51*e*, 53*c*; 51*a*, 53*e*; etc.) align to complete the circuit for activation of the suspended object as they are rotated around the canopy. The current is then carried to one suspended object when the connection is established.

[0069] Plan 11: A detail of one suspended object showing the plug (27*a*) to connect to the battery source, the internal LED's (101, 103) for lighting and the internal placement of the control unit (CU) and memory chip lying between the LED's.

[0070] The CU is an electronic chip that contains certain control routines and program information to orchestrate the internal workings of the suspended objects. Each object is unique from the simplest in Plan 11, to the more complex ones in Plans 14 & 16. The CU includes a timing ability to turn off at the end of its routine until the power is reinitiated.

[0071] Plan 12: A plan of a suspended object showing the internal LED's (101, 103), a speaker (105) and a hole (27*r*) in the object for the sound waves to come through.

[0072] Plan 13: A box diagram of the circuitry necessary for Plan 11 & 12. The control unit (CU) and memory chip (155) is necessary to make the object function. The input point (23) conducts the current into the object. The CU is programed to activate the LEDs (101) and play the pre-programed audio through the speaker (105). Once the pre-programed material is complete, the CU will cease operation.

[0073] The child will see an activity each time s/he pulls the activity/rattle ring to align a new object with the contact points to receive current from the battery. This is part of the engaging and intellectual nature of the Baby Mobile.

[0074] Plan 14: A plan of a suspended object showing the internal LED's (101, 103), a speaker (105), a hole (27*r*) for the sound to come through and a motor (157) to make the wings of the object appear to flutter. The motor is connected to the wings by small springs (106) and will produce the fluttering motion as it receives instruction from the CU and the memory chip.

[0075] Plan 15: The block diagram (similar to Plan 13) with the addition of the motor circuitry (157) for Plan 14.

[0076] Plan 16: A plan of a suspended object (similar to Plan 13) with the addition of a microphone (163) to record audio that is stored on the CU. The recorded audio might include a parent saying a favorite nursery rhyme or lullaby. It might be a recording of the child's own voice or noises. It could be sibling or any other audio source for the recording. To record some audio, the switch (108) must be pressed and held while recording. Once the recording is done, the switch is released.

[0077] Plan 17: A block diagram (similar to Plan 12) with the addition of a microphone (163) for use with Plan 16.

[0078] Plan 18: A plan of a suspended object (similar to Plan 16) with the addition of the wings and motor found in Plan 14.

[0079] Plan 19: The plan shows the inputs; the connection at the plug (23), the microphone (163) and the recording switch (108). It shows the control unit (CU) and the memory ship (155) and the output devices. The output includes a speaker (105), the LEDs (101) and the motor (157) for the wings to move.

[0080] The CU is pre-programed to allow use of all the input and output devices. The recording switch (108) would activate the recording facility on the CU. The CU would store the recorded information and play it back when current came to the object.

[0081] Plan 20 & 21: Shows a detail of the activity/rattle ring (65) and the rattle that is affixed to the ring. When the child pulls the ring, the rattle makes a pleasant sound.

[0082] Plan 22: Illustrating the Baby Mobile in a perspective view with a sliding mounting assembly. The assembly hooks on the internal hook in the ceiling mount (1) and in the

top cover (**21**) of the chassis case. The cord is then threaded through the brake assembly (**5**) to secure the desired position.

[**0083**] Plan 23 & 24: A detail and an exploded view of the brake (**5**) assembly used in Plan 22.

[**0084**] Plan 25: An alternate view of Plan 1. The illustration shows the Baby Mobile without the canopy installed with 4 suspended objects and the ceiling adjustable mount.

[**0085**] Plan 26: An alternate view of Plan 2 without the canopy installed.

[**0086**] Plan 27: A cross section (similar to Plan 3) of the Baby Mobile showing an alternate rotating mechanism and an alternate design for the electrical contact plates.

[**0087**] Plan 28: An exploded view of the rotating mechanism shown in Plan 27. The mechanism uses a detent (**275**) that moves the rotation plate (**273**) in a circular motion to rotate the canopy and make the electrical connections to one suspended object at a time.

[**0088**] Plan 29: A detail of the rotating mechanism shown in Plan 27 illustrating the detent and stop tooth (**281**) to put the electrical contact points in place to make the connection for the suspended objects.

[**0089**] Plan 30: An alternate view of Plan 9 showing the electrical contact plates and the connections using 4 suspended objects instead of 5.

[**0090**] Plan **31 & 32**: A perspective view showing the Baby Mobile using the sliding mounting assembly (Plan 22) and a variation on the activity/rattle ring (**63**) alignment. A horizontal tube (**301**) is utilized to channel for the pull cord into the chassis case.

[**0091**] Plan 33: An elevation view showing the wall mounting assembly (Plan **24**) locked in a storage position up and out of the way.

[**0092**] Plan 34: A detail of the adjustable wall mounting assembly bracket (**403**, **405**), the wall mounting plate (**1**) and the locking pin (**407**) to secure the bracket. The locking pin allows the assembly to be secured in a horizontal position or in the upright storage position (Plan 33).

[**0093**] Plan 35: A cross section of the Baby Mobile showing the variation of the pul cord (Plans 31, 32) and the internal path of the cord.

[**0094**] Plan 36: This is a variation of Plan 8, illustrating an alternate rotation mechanism, its detent (**281**) and stop tooth (**451**).

[**0095**] Plan 37: A cross section of the headboard mounting assembly. The assembly allows the Baby Mobile to be mounted to a crib rail, or other horizontal surface. The assembly is two pieces (**501**, **503**) and can be joined and separated for easy movement of the Baby Mobile.

1. The Baby Mobile can be mounted to a ceiling, wall, headboard or railing through the use of the illustrated mounting attachments. The chassis case contains space for the battery to power the Mobile. The Baby Mobile can be adjusted to most any position by extending or retracting the mounting mechanism. The canopy fits to the bottom of the chassis case. The suspended objects can be attached and detached with ease. It is organized so when the ring is pulled, the canopy rotates in one direction ⅕ rotation to an established position. One object received battery power in the active position which allows light, movement and sound from the object. This is the internal switch device. The internal switch device is inside the chassis case. Based on the rotation, the upper switch device connects to the objects to allow light, movement and sound through the control unit (CU).

2. The Baby Mobile can be secured to the ceiling mounting plate using the adjusting cord (Plan 22, 23, 24). The cord passes through a hook on the upper mount that is attached to the ceiling and through a hook on the top of the chassis case. The cord can be adjusted for length using a brake device (Plan 23, 24).

3. The Baby Mobile chassis case can be attached to the ceiling mounting plate (plan 1, 2, 3). The extending tube has a hook at the end. The bracket tube can be retracted or extended to achieve a fixed position of the Baby Mobile.

4. The Baby Mobile chassis case can be attached to a vertical wall using the wall attachment bracket (Plan 33, 34). The attachment bracket extends horizontally and bends down to connect to the Baby Mobile.

5. The Baby Mobile chassis case can be attached to a railing or bed using the clamping device (Plan 37). The base bracket inserts into the arched portion (Plan 37). The arched bracket attaches to the chassis case using the adjustable cord described in claim 3.

6. The upper rotation mechanism rotates the canopy from its location in the chassis case (Plan 6, 8, 28, 29, 36). The pull string goes through the center of the rotation plate and through a channel to the one-way direction detent. When pulled, the detent rotates the rotation plate which in turn accomplishes the ⅕th rotation of the canopy. The rotation gear has a stopping tooth outside the rotation path to secure the canopy in a fixed position (Plan 8, 29, 36). The stopping tooth mounts to resilient material so it can fix the position while allowing movement when the ring is pulled. Rotation is made possible by the rotation mechanism connected to the upper rotation plate based on the pull ring. After a pull, a spring returns the rotation detent to its original position. The upper end of the rotating axle is held securely in the chassis case, the other end is secured by the spring in the lower end. The rotation plate and the canopy cap have electrical contact points and once the points align, it forms a circuit to activate the suspended object.

7. The rotation plate moves in one direction by the one-way detent and is secured in a fixed position by the stopping tooth. The stopping tooth (Plan 8, item **41***d*) is mounted on a flexible mount to allow the rotation gear to rotate yet holding it in place when no rotation. The rotation plate is secured in place by a spring (Plan 8). The rotation plate turns the center axle to rotate the canopy. Upon rotation, the canopy top plate electrical contacts come into contact with the ones on the bottom of the chassis case forming a circuit with one of the suspended objects. The circuit supplies current to only one object at the connection position from the contact points (Plan 5, item **35***a*, **35***b*). The upper contact plate (Plan 6, item **51**) makes the contact for the circuit for one object at a time. The pull string, rotation plate and mechanism can be configured in an alternate fashion in a lever outside the chassis case (Plan 35).

8. The rotation device (Plan 28) rotates the fixed axle by a ratchet disk to produce movement of the canopy. The fixed axle is secured to the ratchet disk (Plan 28, item **273**). When

the pull string is pulled, the detent moves the ratchet disk and fixed axle in one direction and rotating the canopy. The detent then returns to its original position by the spring.

9. The canopy connections activate the suspended objects unique internal circuitry that includes a control unit (CU) chip and a memory chip and other devices (Plan 11, 12, 14, 16, 18). The objects include internal LED lights, audio playback and recording capability, and certain internal movement devices.

10. The upper control device is inside the chassis case.

11. As one of the suspended objects becomes connected to the power source through the switching device, its internal lighting is activated.

12. As one of the objects becomes connected to the power source through the switching device, it activate its internal lighting plus its sound generating devices.

13. As one of the objects with the wings becomes connected to the power source through the switching device, the motor in the object initiates to make the wings flutter. Once the motor receives power it is active.

14. As one of the objects becomes connected to the power source through the switching device the lighting and other movement device of the object is activated.

15. As one of the objects becomes connected to the power source through the switching device it activates the microphone and recording pathways that is further active by using a push switch at the connector (Plan **16**).

16. As one of the objects becomes connected to the power source through the switching device it activates the microphone and recording pathways, the playback pathways and speakers are multiple functions in the object.

17. Once an object becomes connected to the power source, the current enters the object through the plug at the object while other connectors for other objects remain open.

18. The canopy shades the diffusion of the lights. It is a cover that attaches and detaches easily for cleaning.

19. The pull ring includes a rattle to make noise whenever it is handled by the child.

20. The suspended objects are electrically connected through a socket connector.

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