



US 20050269223A1

(19) **United States**

(12) **Patent Application Publication**
Wawrzynowski

(10) **Pub. No.: US 2005/0269223 A1**

(43) **Pub. Date: Dec. 8, 2005**

(54) **APPARATUS FOR HOLDING A MEDIA STORAGE DISK**

(52) **U.S. Cl. 206/308.1; 206/303; 206/493**

(75) **Inventor: Michael Wawrzynowski, Torrance, CA (US)**

(57) **ABSTRACT**

Correspondence Address:
CHARLES C.H. WU
98 DISCOVERY
IRVINE, CA 92618-3105 (US)

The invention relates in general to an apparatus for holding a media storage disk, more particularly an apparatus having an improved central retaining area for the retention of the media storage disk, along with an optional securing means for engaging the media storage disk around its outside circumference. The disk-receiving portion contains a body portion which includes a circular outer retaining wall whose radius is slightly larger than media storage disk. The body portion also incorporates a central retaining area comprising a cylindrical hub, at least one arm extending radially and downward from the hub toward the body portion, and at least one additional arm opposite the first arm creating a hinge between the hub and body portion. Additionally the body portion may incorporate a means to secure the outer diameter of the media storage disk.

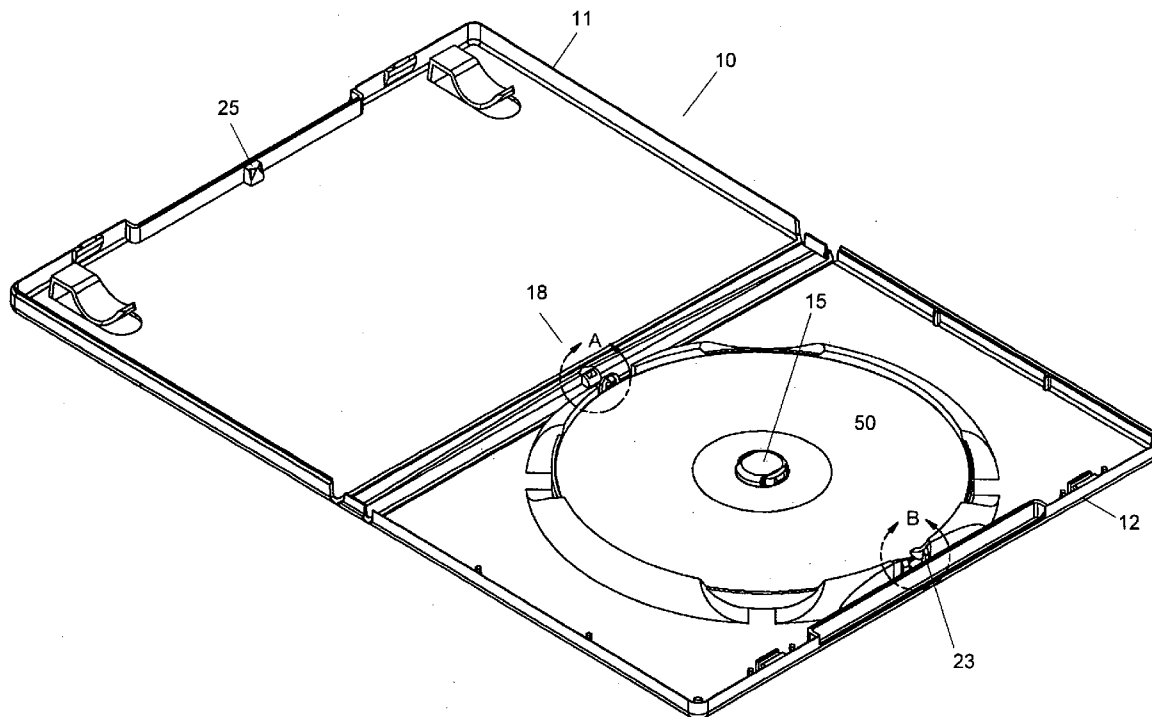
(73) **Assignee: INFINITI MEDIA, INC.**

(21) **Appl. No.: 10/863,399**

(22) **Filed: Jun. 7, 2004**

Publication Classification

(51) **Int. Cl.⁷ B65D 85/57**



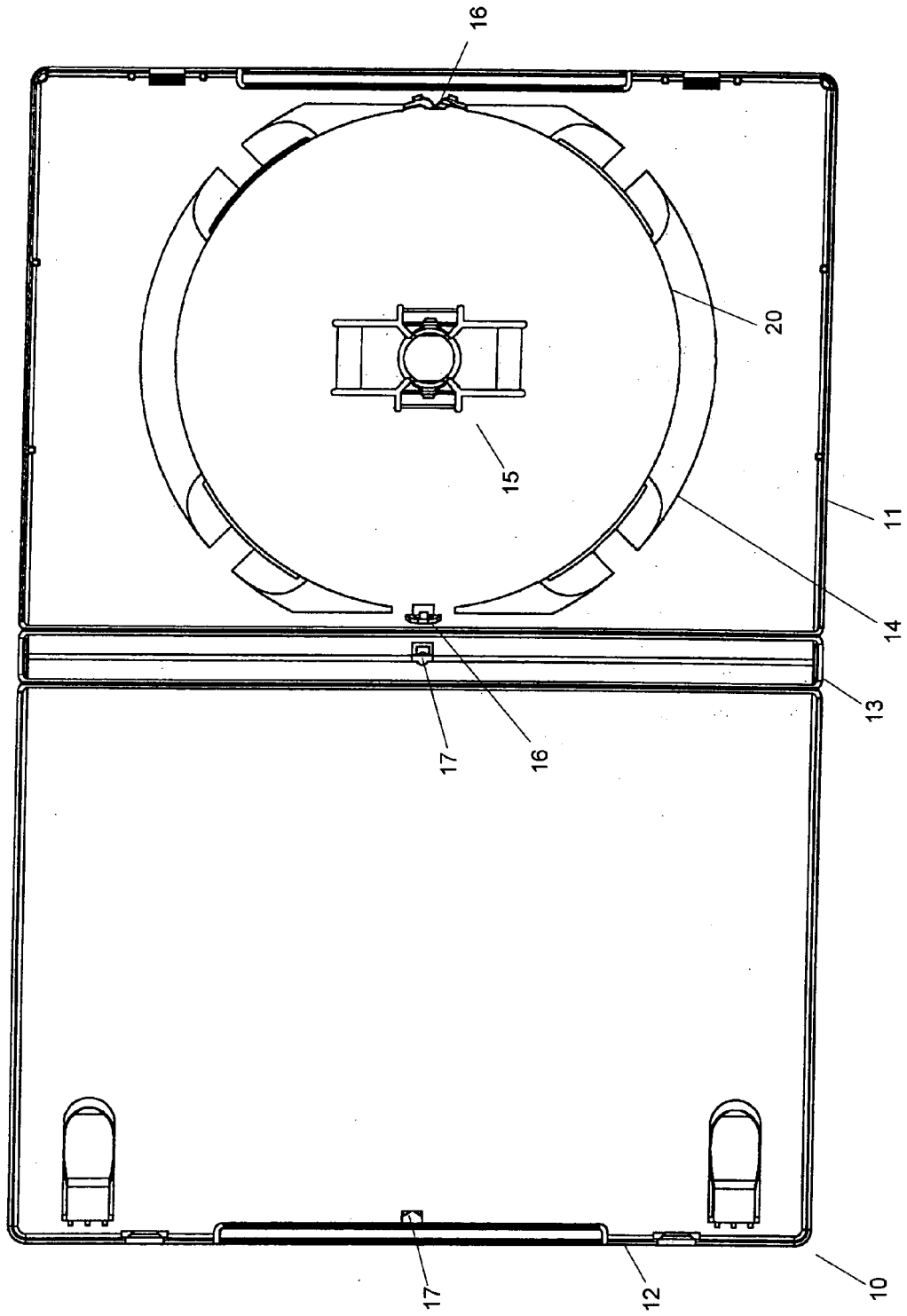


FIG. 1

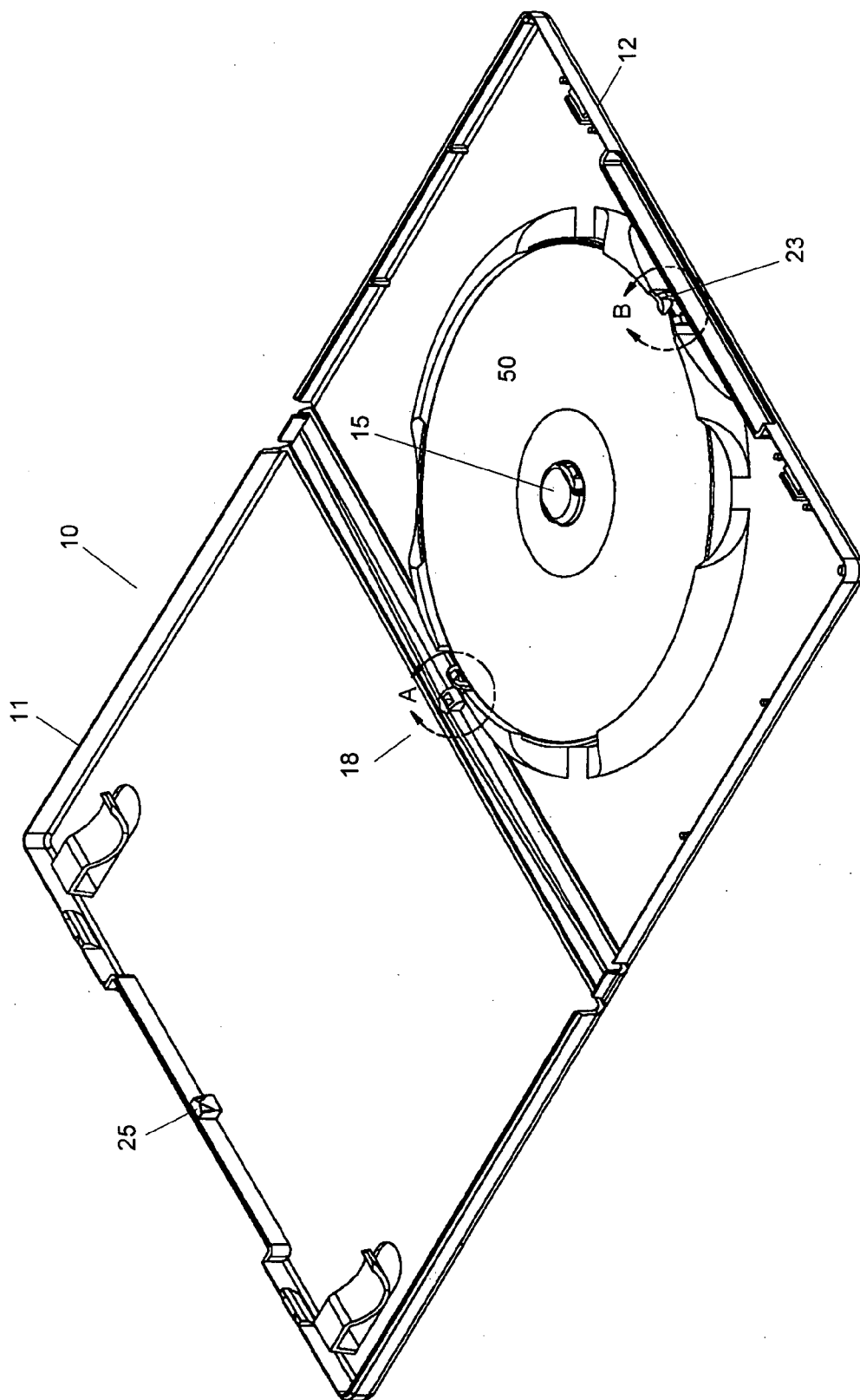
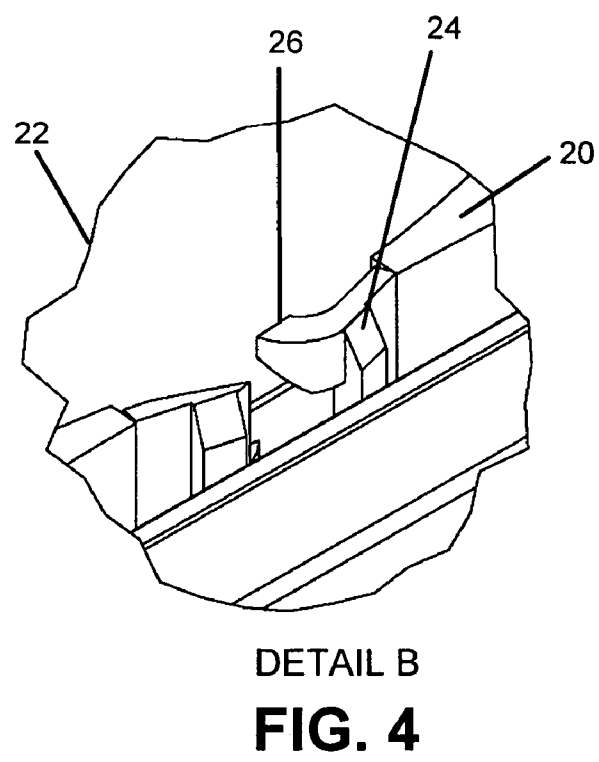
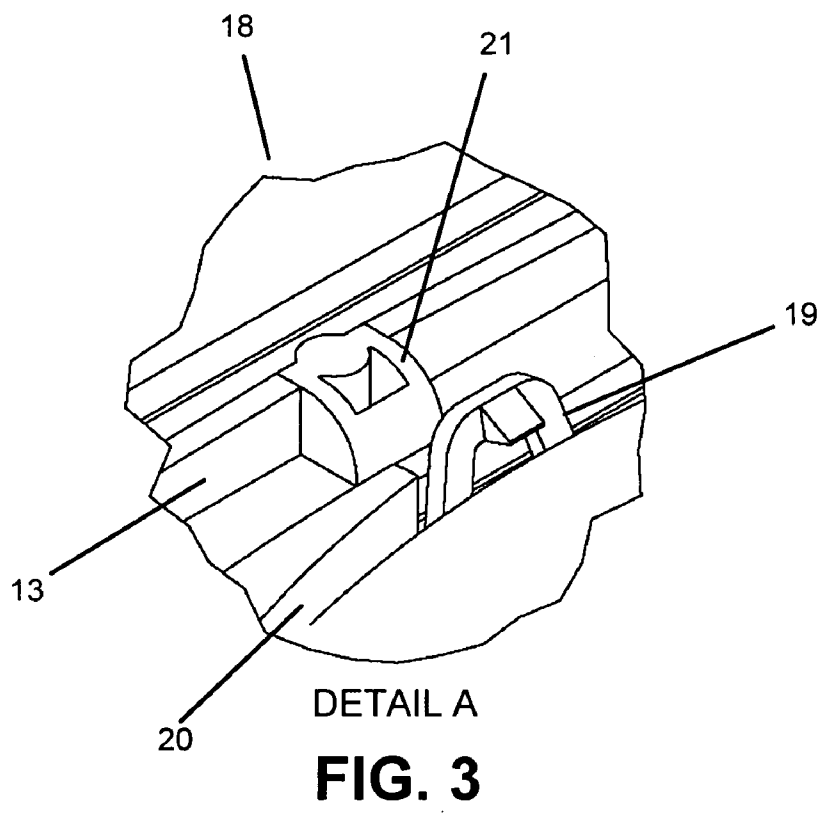


FIG. 2



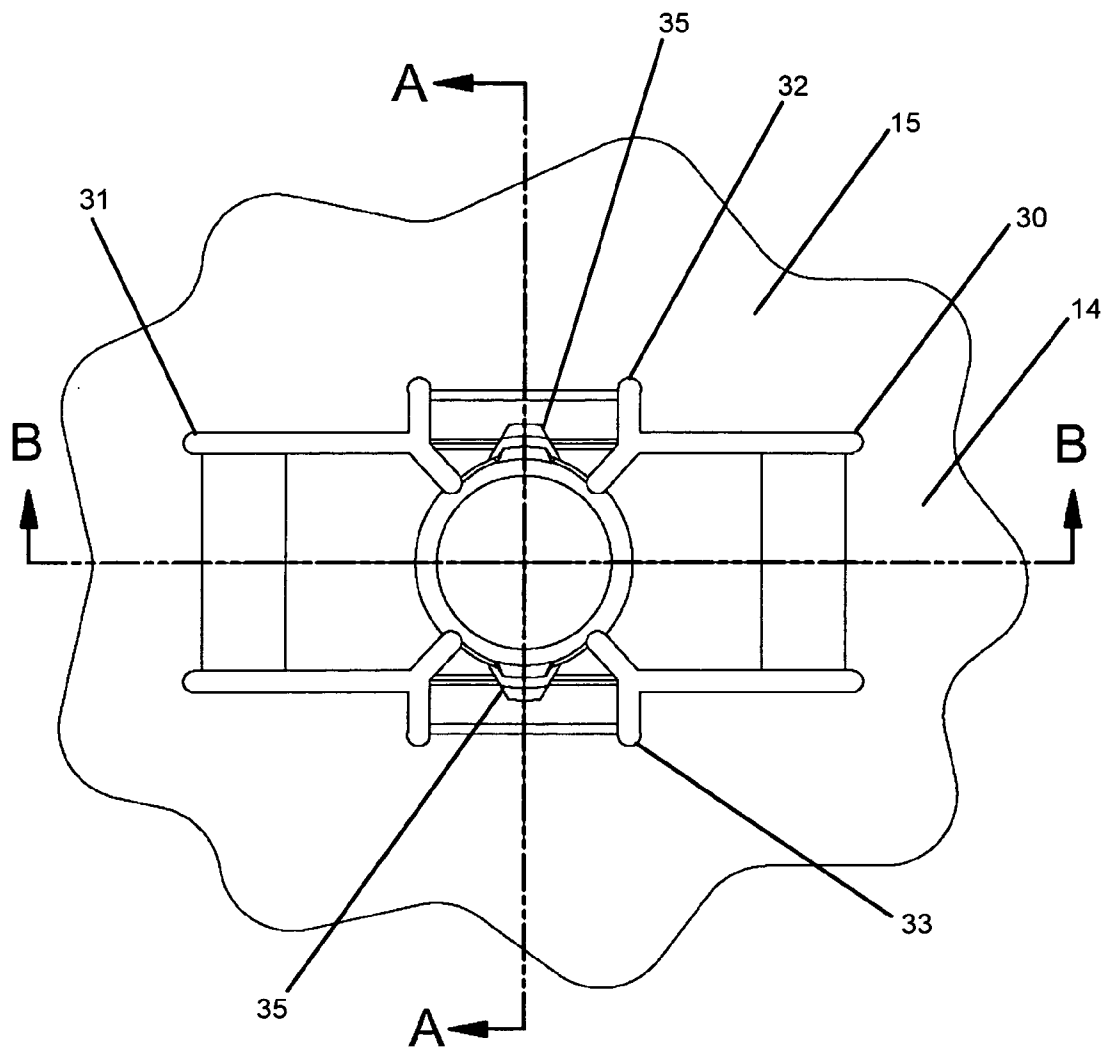


FIG. 5

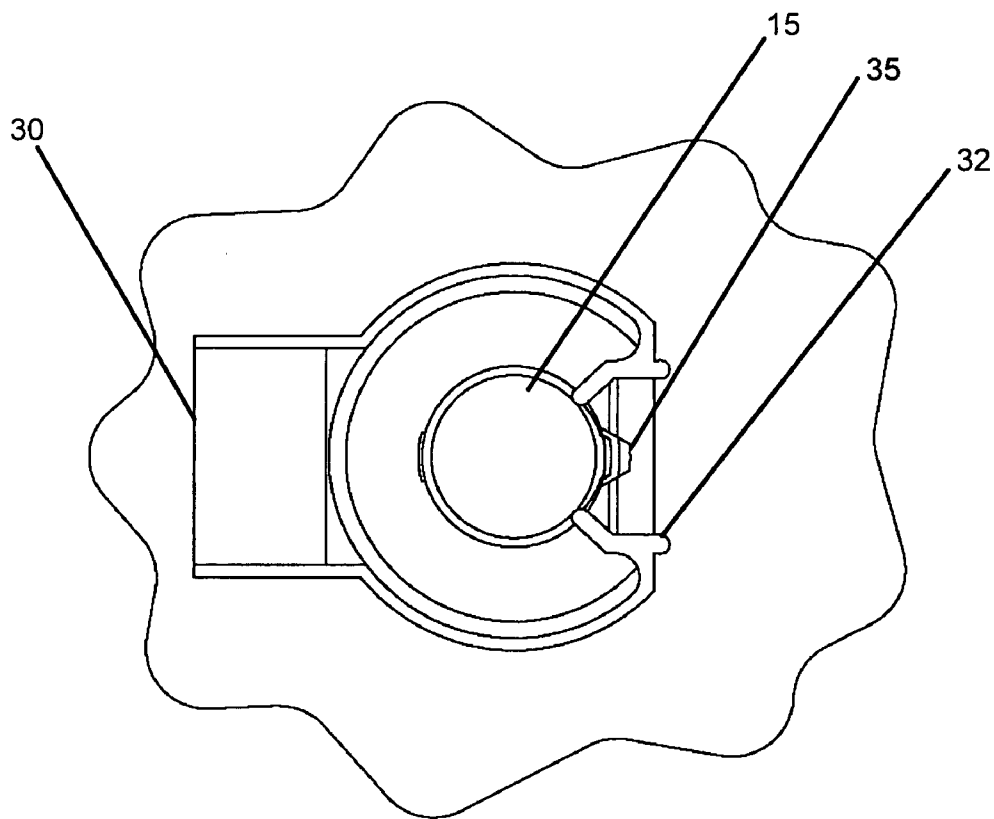


FIG. 5A

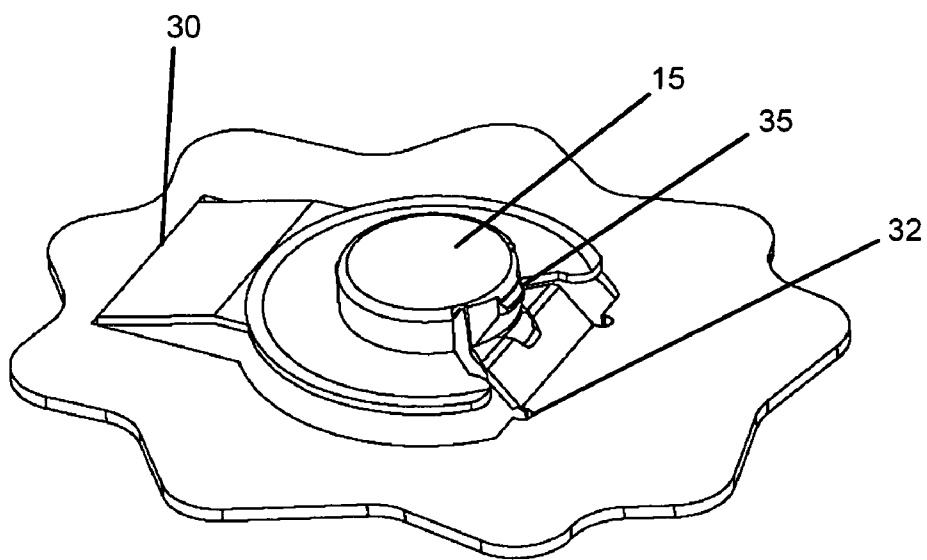
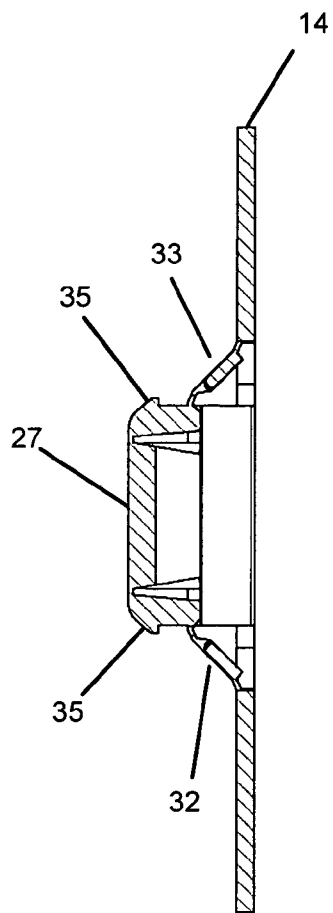
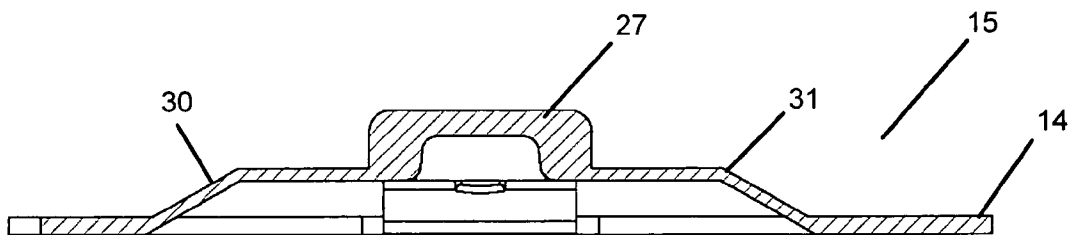


FIG. 5B



SECTION A-A

FIG. 6



SECTION B-B

FIG. 7

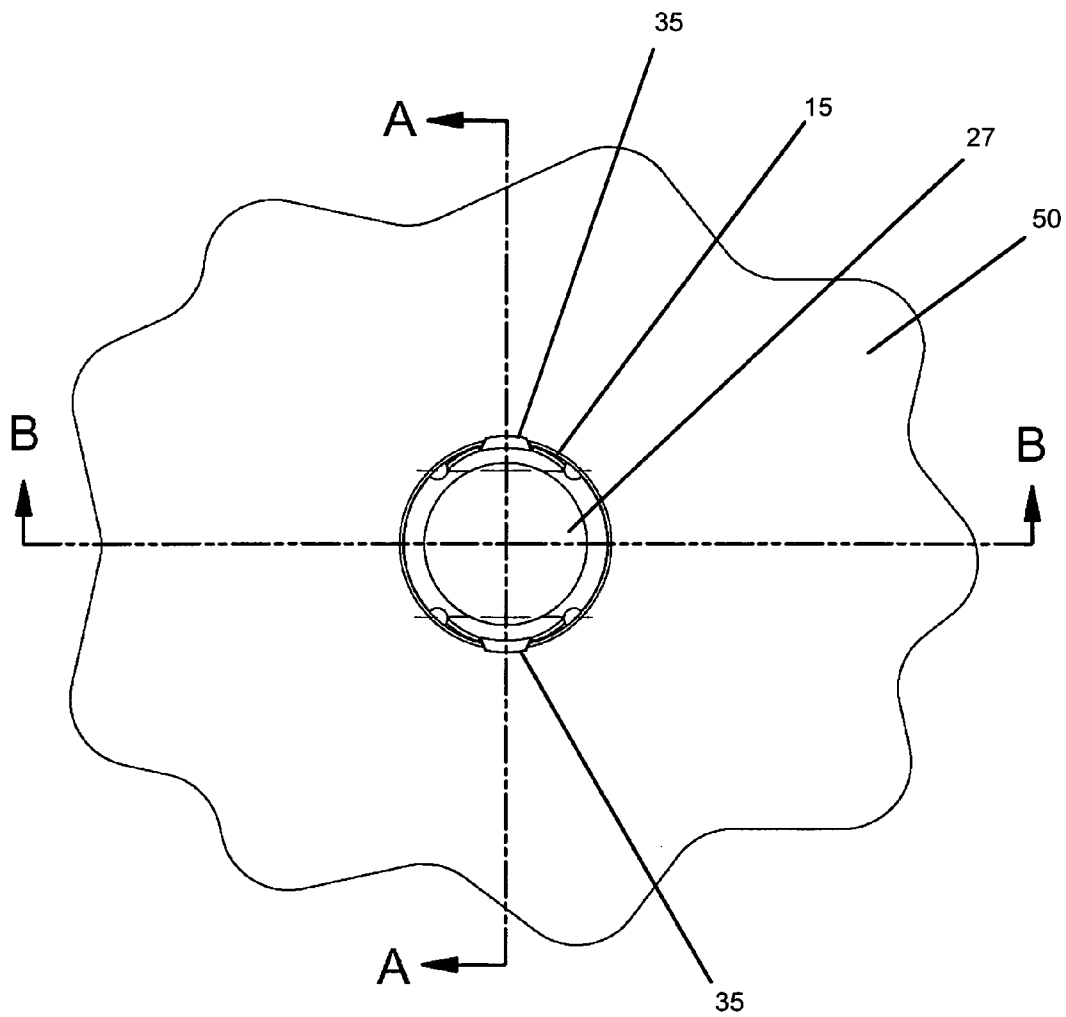
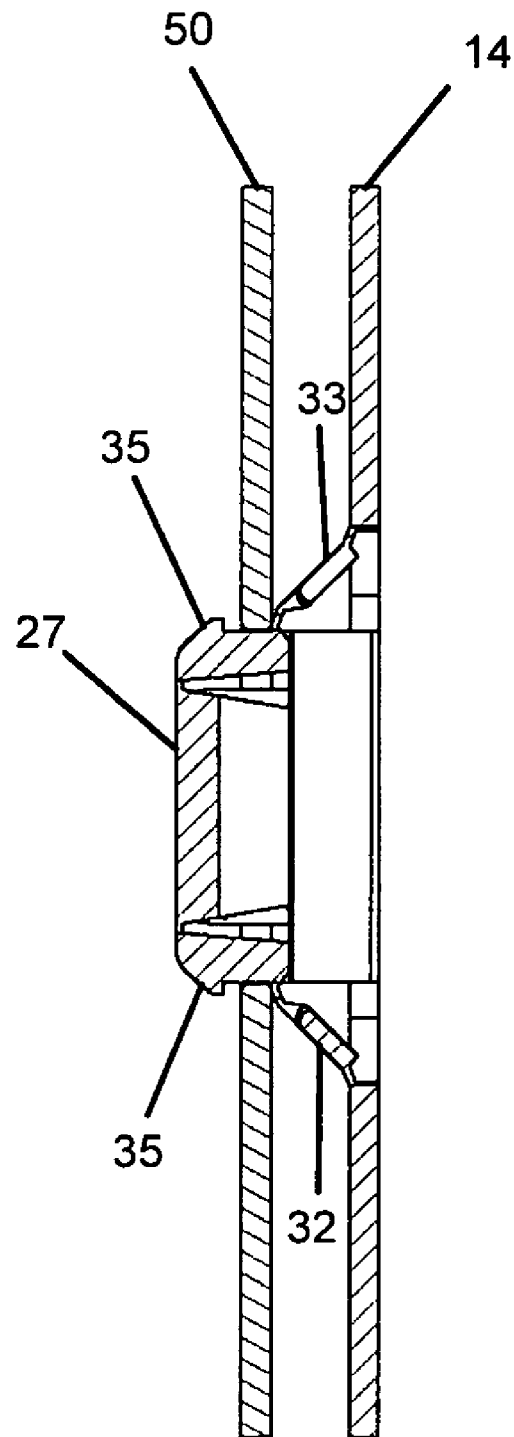
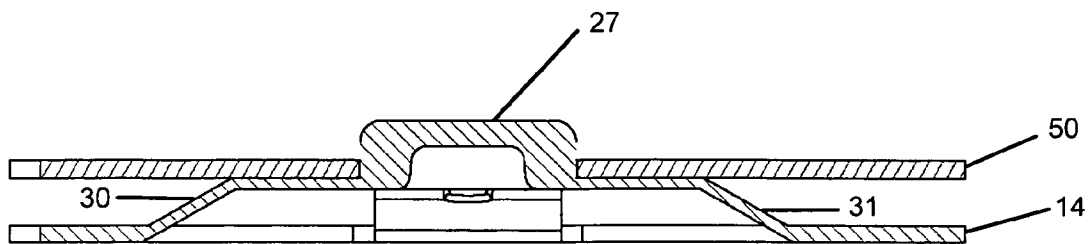


FIG. 8



SECTION A-A

FIG. 9



SECTION B-B

FIG. 10

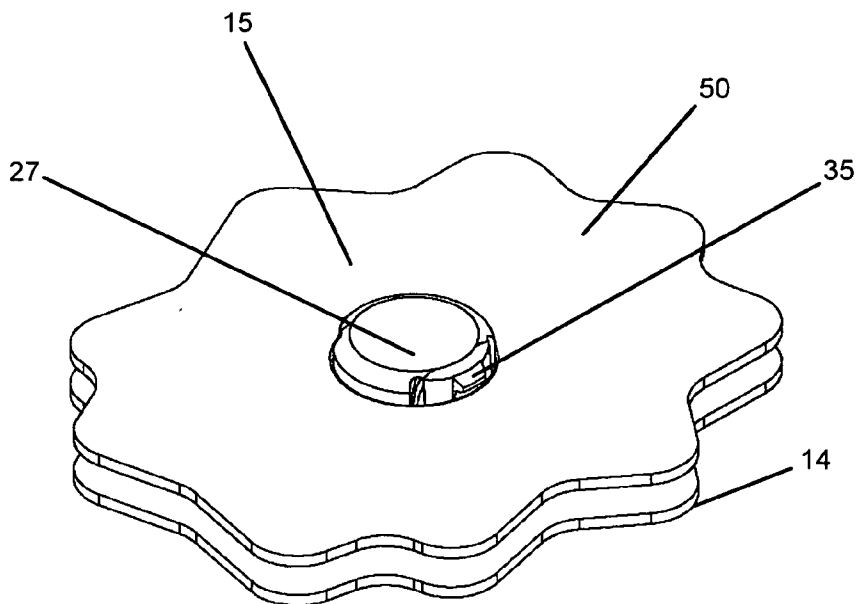


FIG. 11

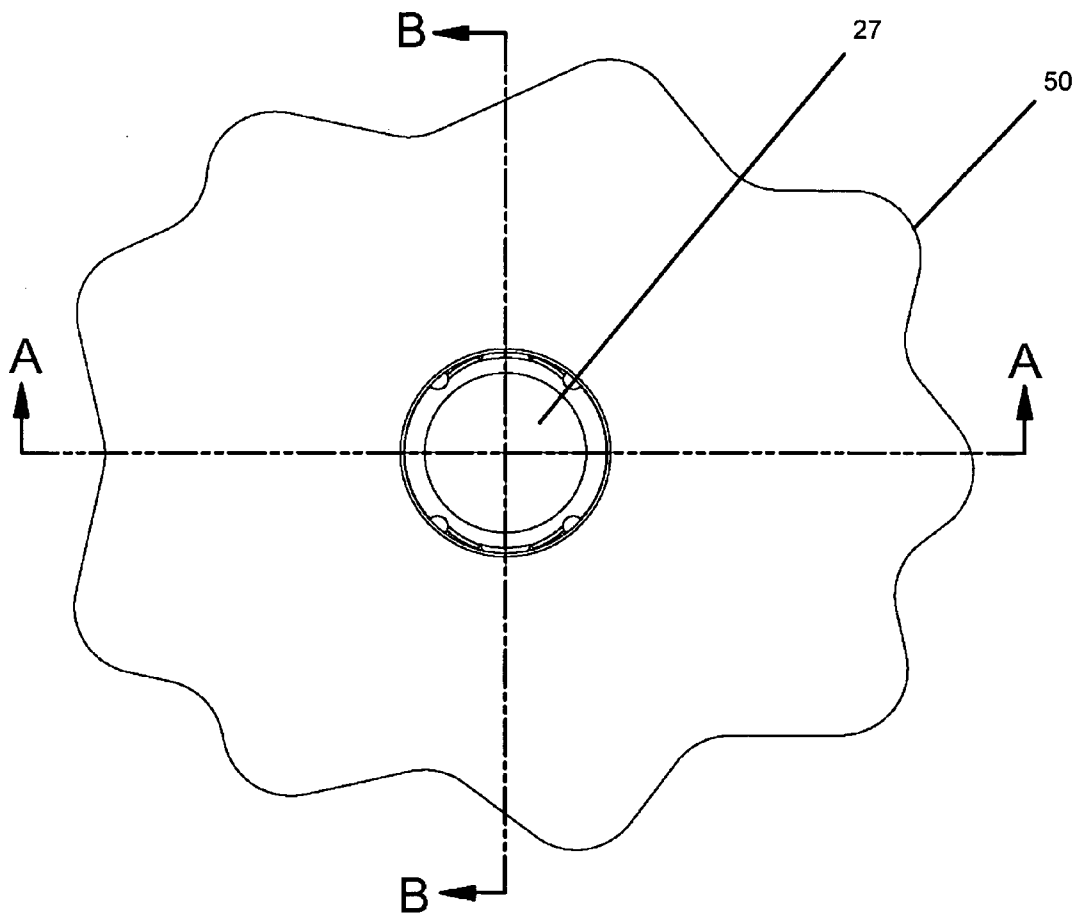
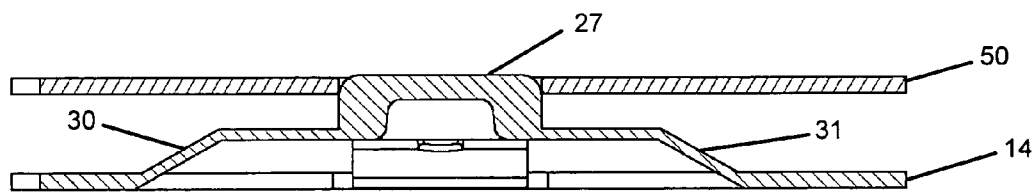
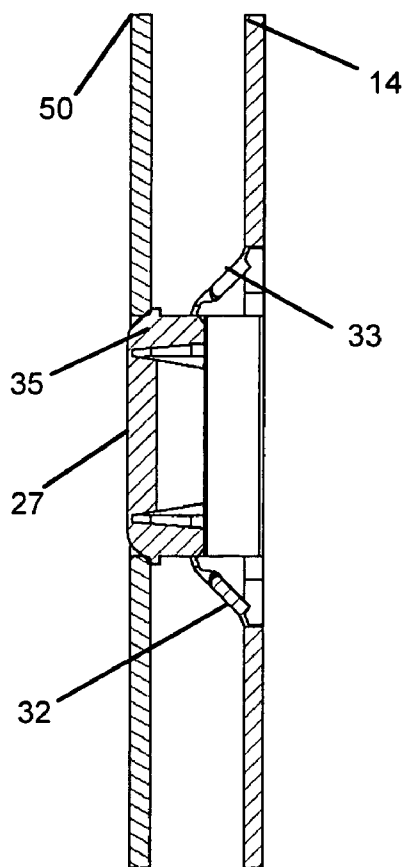


FIG. 12



SECTION A-A

FIG. 13



SECTION B-B

FIG. 14

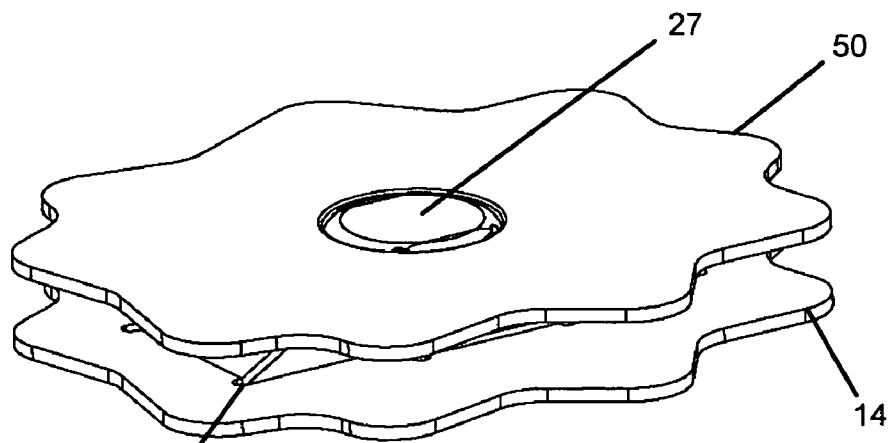


FIG. 15

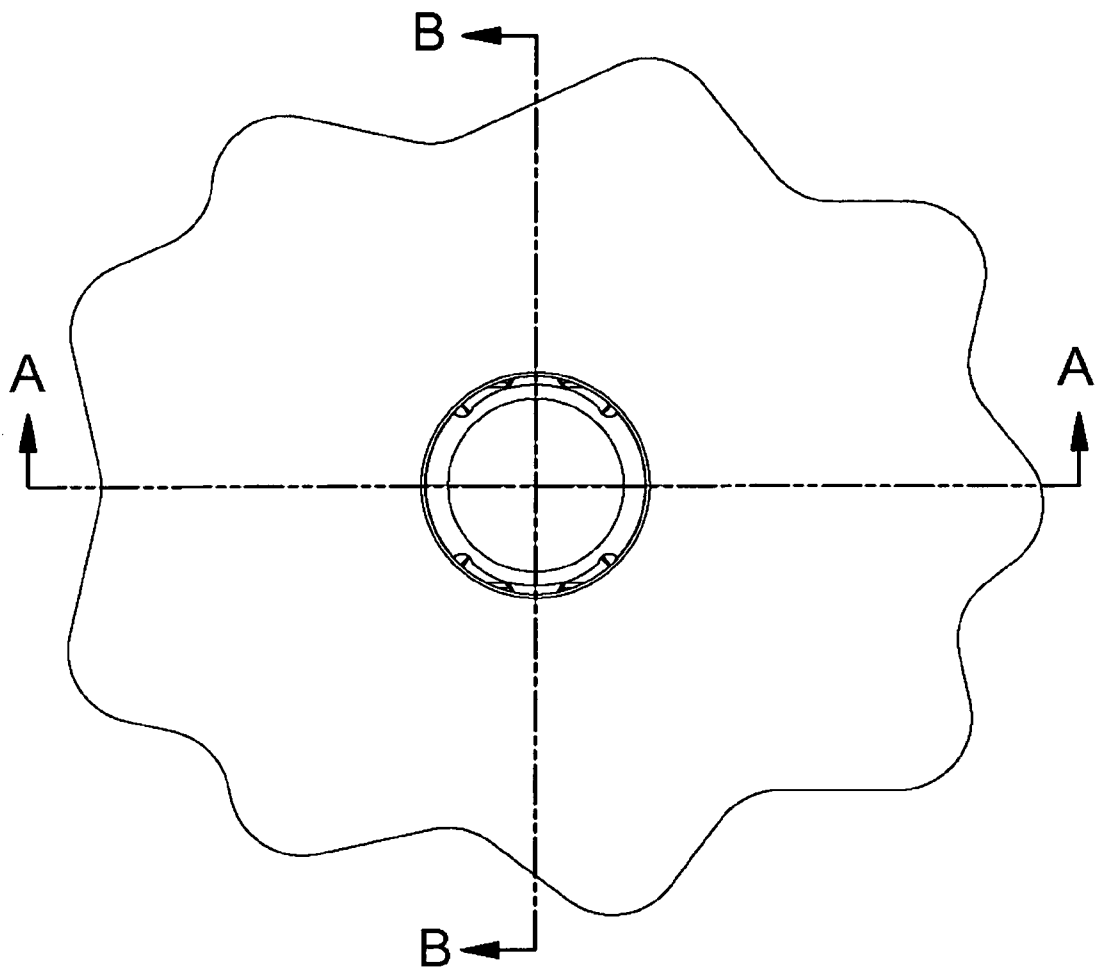
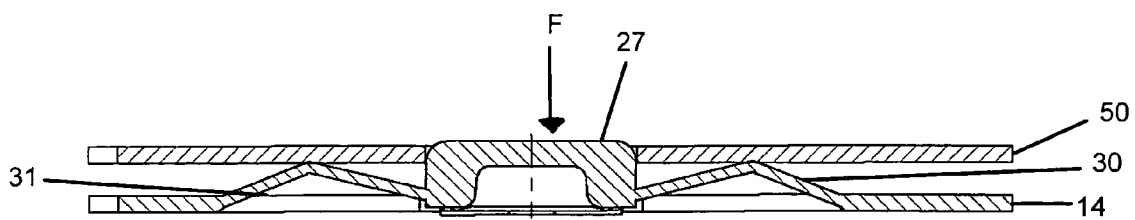
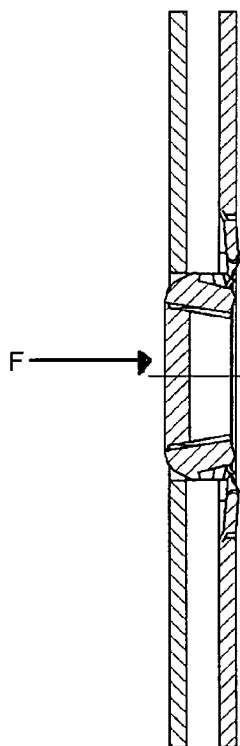


FIG. 16



SECTION A-A

FIG. 17



SECTION B-B

FIG. 18

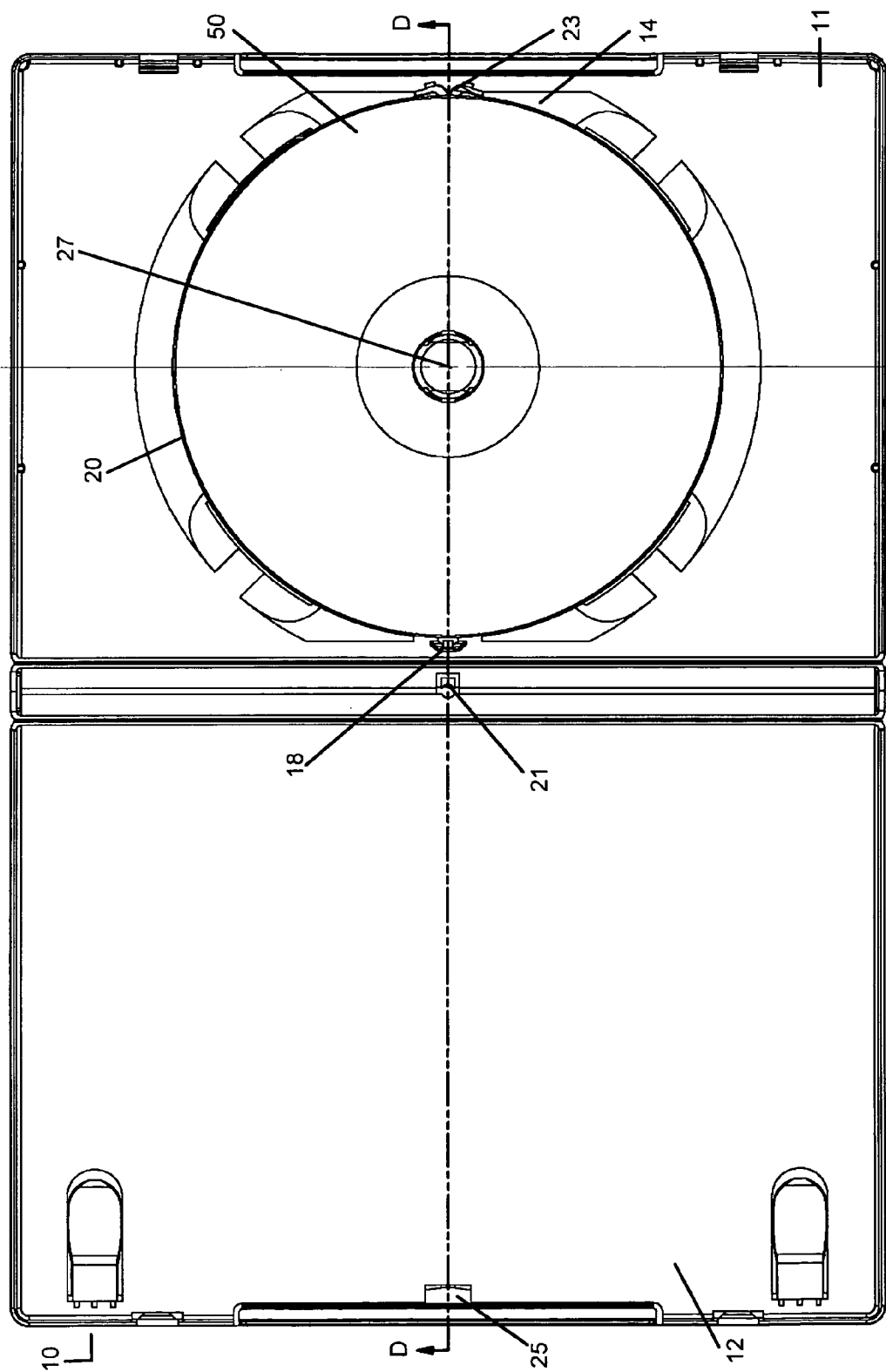


FIG. 19

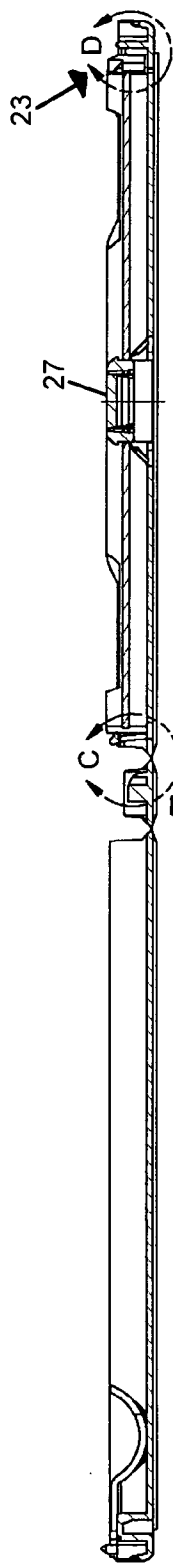


FIG. 20

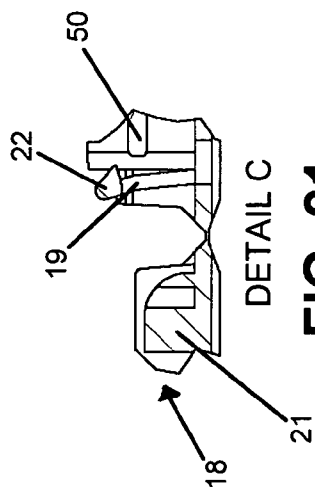


FIG. 21
DETAIL C

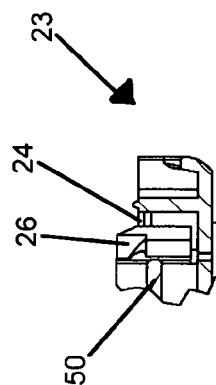


FIG. 22
DETAIL D

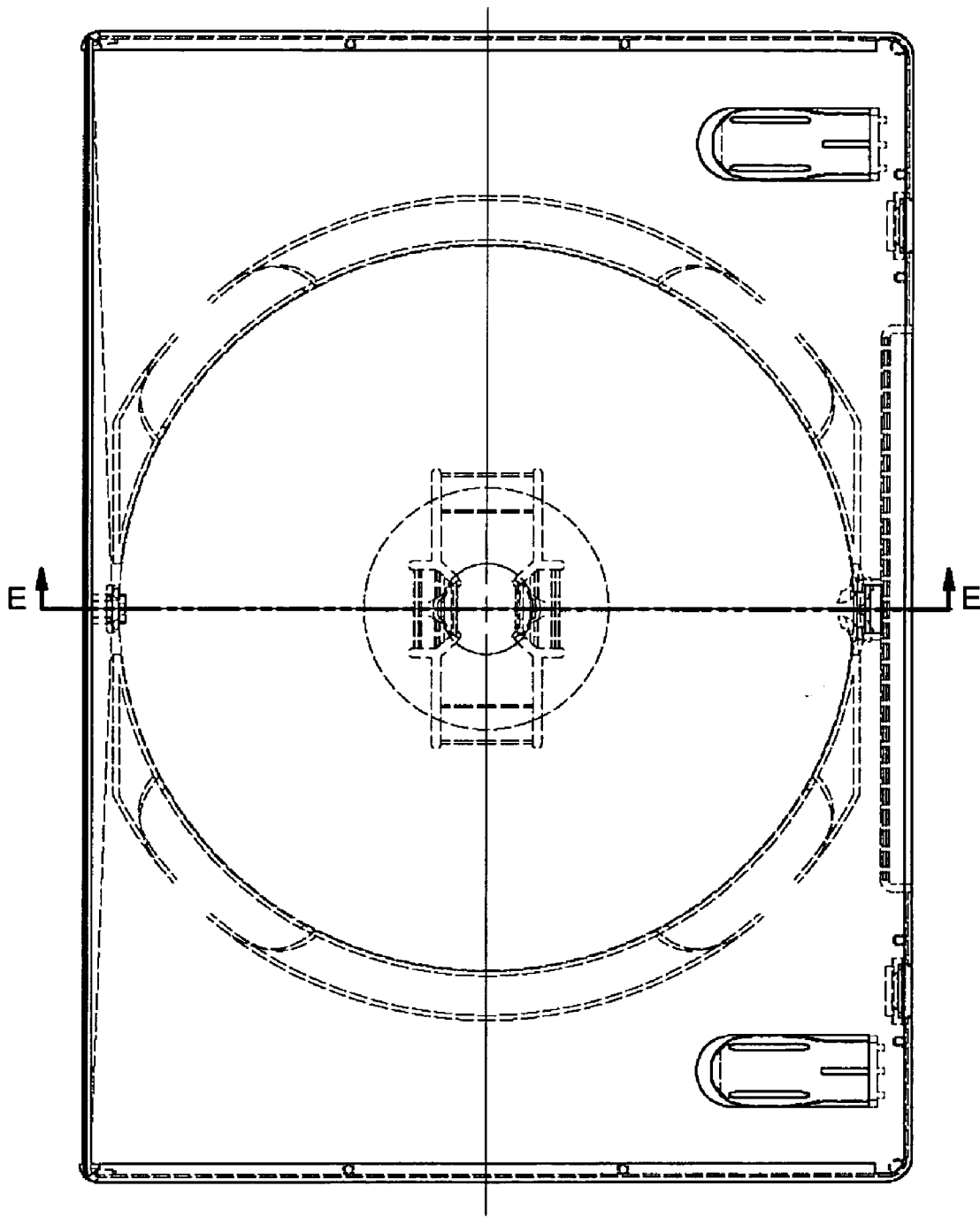
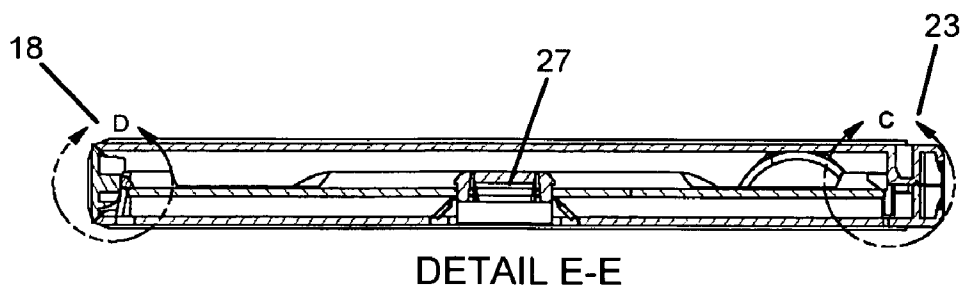
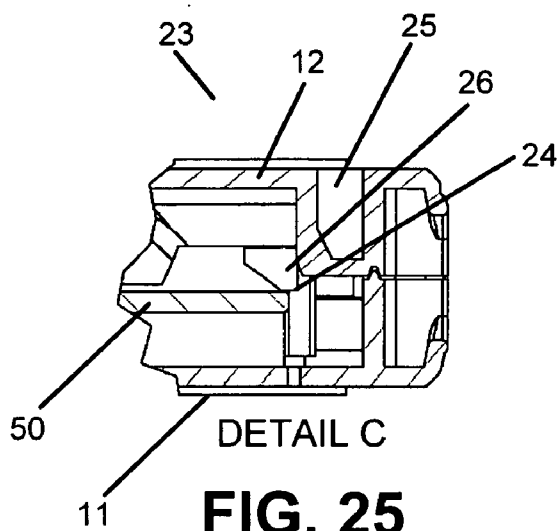


FIG. 23



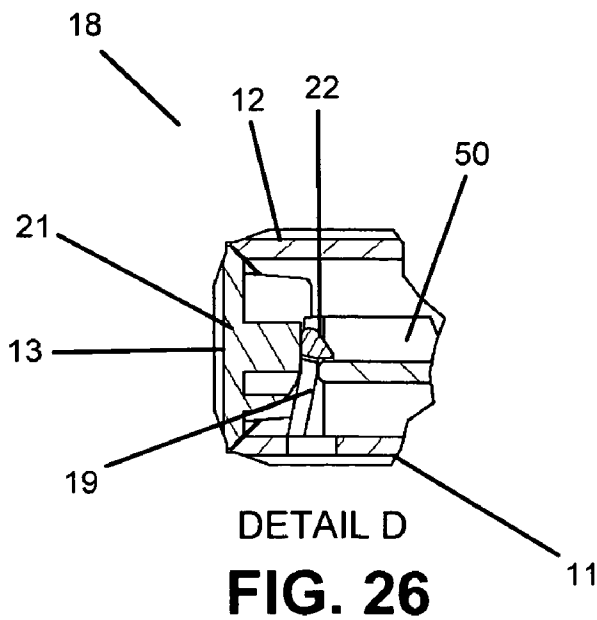
DETAIL E-E

FIG. 24



DETAIL C

FIG. 25



DETAIL D

FIG. 26

APPARATUS FOR HOLDING A MEDIA STORAGE DISK

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention relates in general to an apparatus for holding a media storage disk, more particularly an apparatus having an improved central retaining area for the retention of the media storage disk, along with an optional securing means for engaging the media storage disk along its outer edge.

[0003] 2. Description of the Related Art

[0004] Media storage disks have gained popularity with consumers. Examples of media storage disks include, but are not limited to, the compact disk (CD), the digital video disk (DVD) and the video compact disk (VCD).

[0005] Numerous storage cases have been developed for media storage disks. It is appreciated by designers of storage cases that it is undesirable for any portion of the case to be in contact with the information-carrying portions of the disk. Thus, developments in storage case design have involved means that limit the contact of the case with the disk to the central hole of the disk.

[0006] In addition to addressing the retention of media storage disks, case designs have also provided for the convenient ejection of the disk. Because DVDs consist of two laminated layers of polycarbonate, the bending of the DVDs for engagement and removal can cause disk and hence data damage. To avoid this damage, it is desirable for a case to provide convenient insertion and removal of the disk.

[0007] A common problem associated with most storage case designs is disk loosening and removal from a prepackaged case. A prepackaged case typically has an embedded alarm sensor. The actual disk, however, has no alarm-sensing device. By pressing the center of the storage case wall against the disk, it is possible to loosen and disengage a disk from the central retaining area.

[0008] This design flaw facilitates the theft of disks from their prepackaged cases. In addition, it greatly increases the susceptibility of disk damage during normal handling, transport and storage procedures.

[0009] Thus, the need arises for a media storage case that limits the contact of the case with information-carrying portions of the disk, allows for easy disk insertion and removal, and is not susceptible to disk loosening and removal from the central retaining portion.

[0010] In U.S. Pat. No. 6,227,362, Cheung discloses an apparatus for holding a media storage disk with a central hole. Although Cheung lessens the susceptibility to disk loosening when pressure is applied to the center of the storage case, it does not provide for convenient insertion of the disk. Before inserting the disk, the central retaining area must be positioned into a disk-releasing position by applying pressure to an articulation axis. This leads to an additional step in the disk packaging process, which is undesirable.

[0011] Unlike Cheung, the present invention uses pivot axes on each of the extending arms. The configuration of the present invention eliminates the need for applying pressure

to an articulation axis, thus facilitating the disk packaging process. Disks can simply be pressed onto the central retaining area when packaging.

[0012] Through the years many apparatus for holding media storage disks have been developed. The most successful ones to date are ones which incorporate disk lifting capabilities through the incorporation of a central cylindrical hub which is split in half, thirds, quarters or more sections. Generally, when pressing these split hubs the user experiences an unpleasant pinching sensation. Additionally, these split hubs for engaging the storage media are prone to damage if one of the sections is pressed faster or harder than any of the remaining sections of the hub.

SUMMARY OF THE INVENTION

[0013] Accordingly, one object of the present invention is to provide a disk storage apparatus having an improved central retaining area for the retention of a media storage disk.

[0014] A second object of the invention is to provide a disk storage apparatus that limits contact with information-carrying portions of the disk.

[0015] A third object of the invention is to provide a disk storage apparatus that allows for easy insertion and removal of the disk.

[0016] A fourth object of the invention is to provide a disk storage apparatus that is not susceptible to disk loosening and removal when pressure is applied to the center of the storage case.

[0017] A fifth object of the invention is to provide a disk storage apparatus that facilitates the disk packaging process by eliminating the need for performing additional steps when transitioning between a disk-releasing position and a disk-securing position.

[0018] A sixth object of the invention is to provide a disk storage apparatus that is simple and inexpensive to produce.

[0019] A seventh object of the invention is to provide a disk storage apparatus which does not pinch the fingers of users when releasing the disk from the central hub.

[0020] To achieve these and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, the invention provides an apparatus for securely holding a compact disk having a central aperture. The apparatus includes a body portion and at least one flexible arm radially connected to a cylindrical hub and extending downwardly to the flat planar surface. The arm is designed to give ejecting spring force and resting support for the disk. A second arm incorporating a molded engagement finger as part of the hub is pivotally connected opposite the first flexible arm radiating outward from the cylindrical hub to provide a hinge for locking and unlocking the disk from the apparatus. When the cylindrical hub is depressed the engagement fingers collapse downwardly below the surface of the disk inward to the center of the hub. When the pressure applied to the hub is released, the molded engagement fingers are lifted to disengage the disk from the apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] FIG. 1 is an overhead view of a case that incorporates the apparatus for holding a media storage disk in

accordance with the preferred embodiment of the present invention, the case being in a fully open position with the interior portion visible.

[0022] FIG. 2 is a perspective view of the preferred embodiment of the invention containing a media storage disk in the disk-locking position with the case being in a completely open position with the interior portion visible.

[0023] FIG. 3 is an enlarged view of region A in FIG. 2.

[0024] FIG. 4 is an enlarged view of region B in FIG. 2.

[0025] FIG. 5 is an enlarged view of the hub section of the apparatus in FIG. 1.

[0026] FIG. 5A is a downward view of an alternate embodiment of the hub section.

[0027] FIG. 5B is an enlarged perspective view of FIG. 5A.

[0028] FIG. 6 is a cross-sectional view taken along A-A of FIG. 5.

[0029] FIG. 7 is a cross-sectional view taken along B-B of FIG. 5 when the apparatus.

[0030] FIG. 8 is an enlarged overhead view of the hub section of the apparatus in FIG. 2 when in the disk is engaged by the central retaining assembly.

[0031] FIG. 9 is a cross-sectional view taken along A-A of FIG. 8.

[0032] FIG. 10 is a cross-sectional view taken along B-B of FIG. 8.

[0033] FIG. 11 is a perspective view of the hub section of the apparatus in FIG. 2 when in the disk is engaged by the central retaining assembly.

[0034] FIG. 12 is an enlarged overhead view of the hub section of the apparatus in FIG. 2 when in the disk-released position.

[0035] FIG. 13 is a cross-sectional view taken along A-A of FIG. 12.

[0036] FIG. 14 is a cross-sectional view taken along B-B of FIG. 12.

[0037] FIG. 15 is an enlarged perspective view of the hub section of the apparatus in FIG. 2 when in the disk-released position.

[0038] FIG. 16 is of the hub section in the act of releasing the media disk when force is downward applied to the hub section.

[0039] FIG. 17 is a cross-sectional view taken along A-A of FIG. 16.

[0040] FIG. 18 is a cross-sectional view taken along B-B of FIG. 16.

[0041] FIG. 19 an overhead view of the invention in the disk-locking position with the case being in a completely open position with the interior portion visible.

[0042] FIG. 20 is a cross-sectional view taken along lines D-D of FIG. 19.

[0043] FIG. 21 is an enlarged view of Region C of FIG. 20.

[0044] FIG. 22 is an enlarged view of Region D of FIG. 20.

[0045] FIG. 23 a overhead view of a preferred embodiment of the invention in the disk-locking position with the case being in a completely closed position with the interior portion not visible.

[0046] FIG. 24 is a cross-sectional view taken along lines E-E of FIG. 23.

[0047] FIG. 25 is an enlarged view of Region C of FIG. 24.

[0048] FIG. 26 is an enlarged view of Region D of FIG. 24.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0049] FIG. 1 presents an overhead view of the apparatus for holding a media storage disk in accordance with the present invention is shown. FIG. 2 presents a perspective view of the apparatus retaining a media storage disk in accordance with the actual invention shown. FIGS. 1 and 2 illustrate case 10 in a fully open position with the interior portion visible. Case 10 provides enclosure to hold a media storage disk such as, but not limited to, a CD, DVD, or VCD. Case 10 preferably includes a disk-receiving portion 11 and a cover portion 12. Disk-receiving portion 11 can move relative to cover portion 12 via a hinged region 13, so that when case 10 is in a closed position, disk-receiving portion 11 and cover portion 12 form an enclosure around the disk.

[0050] Still referring to FIGS. 1 and 2, disk-receiving portion 11 contains a body portion 14 which includes a circular outer retaining wall 20 whose radius is slightly larger than media storage disk 50. Body portion 14 also including a central retaining area 15 and a pair outer retaining means 16 incorporated in the outer retaining wall 20. Body portion 14 may provide for the entire or a substantial part of disk-receiving portion 11, or may be a separate or stepped molding. Body portion 14 may also be an insert receivable within case 10. Central retaining area 15 provides for securing the media storage disk 50 within case 10 and is now described in further detail.

[0051] With reference to FIG. 3 which depicts an enlarged version of the first outer retaining mechanism 18 proximally located near hinged region 13 on disk receiving portion 11. First outer retaining mechanism 18 comprises post 19 integrated into the circumference of retaining wall 20 possessing. Post 19 incorporates lip 22 to secure disk 50. Lip 22 engages disk 50 when block 21 contacts post 19 when case 10 is in the closed position. The first outer retaining mechanism 18 releases disk 50 when case 10 is open as a result of block 21 no longer contacting post 19 when case 10 is in the open position.

[0052] With reference to FIG. 4 which depicts an enlarged version of the second outer retaining mechanism 23 located opposite both first outer retaining mechanism 18 and hinged portion 13. Second outer retaining mechanism 23 comprises post 24 integrated on the outer circumference of retaining wall 20. Post 24 incorporates lip 26 to secure disk 50. Post 24 engages disk 50 when block 25 contacts post 24 when case 10 is in the closed position. Lip 26 of post 24 releases

disk 50 when case 10 is open as a result of block 25 no long contacting post 24 to engage lip 26 over the outer circumference of disk 50.

[0053] With reference to FIG. 5 which depicts an enlarged view of central retaining section 15 that comprises a cylindrical hub 27 whose diameter is slightly less than the diameter of the center aperture of disk 50, a first pair of arms 30 and second pair of arms 31 extending radially and downward toward the body portion 14. First pair of arms 30 extends opposite the second pair of arms 31 from hub 27. Both first pair of arms 30 and second pair of arms 31 are designed to provide ejection force when hub 27 is depressed to release disk 50, and resting support for disk 50 when engaged in the apparatus.

[0054] A third pair of arms 32 and fourth pair of arms 33 are pivotally connected to the cylindrical hub 27 which provide a hinge for locking and unlocking disk 50. Third pair of arms 32 and fourth pair of arms 33 are located opposite each other and equidistant from first pair of arms 30 and second pair of arms 31.

[0055] Said third pair of arms 32 and said fourth pair of arms 33 create a hinge between hub 27 and body portion 14 necessary for locking and unlocking disk 50 from the apparatus. Aligned with said third pair of arms 32 and said fourth pair of arms 33 is a retractable finger protruding from hub 17 to engage disk 50 when in the locked position in the apparatus. When downward pressure is applied to hub 27 fingers 35 retract inside hub 27 thereby releasing disk 50.

[0056] Alternatively, according to FIGS. 5A and FIG. 5B, only the first pair of arms 30 and the third pair of arms 30 radiate from hub 15. The first pair of arms 30 and third pair of arms 32 are generally 180 degrees apart, radiating from hub 15 in generally opposite directions. Thus, the second pair of arms 31 and fourth pair of arms 33 may be completely disregarded for this alternative embodiment.

[0057] With respect to FIG. 6 which depicts a cross section of hub section 15 along lines A-A in FIG. 5. Third pair of arms 32 and fourth pair of arms 33 are located opposite each other and equidistant from first pair of arms 30 and second pair of arms 31 each possessing creating hinge between hub 27 and body portion 14 necessary for locking and unlocking disk 50 from the apparatus. Aligned with said third pair of arms 32 and said fourth pair of arms 33 is a retractable finger protruding from hub 17 to engage disk 50 when in the locked position in the apparatus. When downward pressure is applied to hub 27 fingers 35 retract inside hub 27 thereby releasing disk 50.

[0058] With respect to FIG. 7 which depicts a cross section of hub section 15 along lines B-B in FIG. 5. First pair of arms 30 and second pair of arms 31 extend radially and opposite each other from hub 27 and downward toward body portion 14. First pair of arms 30 and second pair of arms 31 are designed to provide ejection force when hub 27 is depressed, and resting support for disk 50 when disk is engaged in the apparatus.

[0059] FIGS. 8, 9, 10 and 11 depict central retaining assembly 15 in the locked position engaging disk 50. When in the locked position, fingers 35 located on hub 27 engage disk 50 by overlapping the inner diameter of disk 50.

[0060] FIG. 9 depicts the cross-sectional view of FIG. 8 along line A-A. When in the locked position, fingers 35

located on hub 27 engage disk 50 along the inner diameter of disk 50. Third pair of arms 32 and fourth pair of arms 33 which form a hinge between hub 27 and body portion 14 are partially collapsed downward when disk 50 is in the locked position thereby providing a spring force when hub 27 is depressed to unlock disk 50 from fingers 35.

[0061] FIG. 10 depicts a cross-sectional view of FIG. 8 along line B-B. First pair of arms 30 and second pair of arms 31 extend radially from hub 27 downward toward the body portion 14. When disk 50 is in the locked position in the apparatus, first pair of arms 30 and second pair of arms 31 are partially depressed to provide ejection force when hub 27 is depressed. First pair of arms 30 and second pair of arms 31 also provide resting support for disk 50 when disk is engaged in the apparatus to elevate media storage side of disk 50 from body portion 14.

[0062] FIGS. 12, 13, 14, and 15 depict disk 50 in the unlocked position immediately after being released from the assembly. When in the unlocked position, disk 50 disengages from and sits atop fingers 35. As depicted in FIG. 13, the released disk is no longer in contact with first pair of arms 30 or second pair of arms 31. Third pair of arms 32 and fourth pair of arms 33 are no longer compressed allowing the hinge to return to an approximately forty-five (45) degree angle between hub 27 and body portion 14.

[0063] FIGS. 16, 17, and 18 depict the apparatus when downward force is applied to hub 27 to release disk 50 from the apparatus. When force is applied to hub 27, fingers 35 retract inside 27 hub disengaging disk 50 from hub 27. As depicted in FIG. 17 which is a cross-sectional view of FIG. 16 along lines A-A, first pair of arms 30 and second pair of arms 31 move upward to dislodge disk 50 from hub 27 after fingers 35 retract. As reflected in FIG. 18 which is a cross-sectional view of FIG. 16 along lines B-B, third pair of arms 32 and fourth pair of arms 33 are compressed downward toward body portion 14 as a result of the force applied to hub 27 thus creating a pivotal hinge for unlocking disk 50.

[0064] FIG. 19 depicts case 10 in the open position revealing the entire interior of the apparatus with disk 50 engaged therein. FIG. 20 provides a cross-sectional view of FIG. 19 along lines D-D. FIGS. 21 and 22 provide enlargements of first outer retaining mechanism 18 and second outer retaining mechanism 19, respectively. The first outer retaining mechanism depicted in FIG. 21 comprises a post 19 incorporating lip 22 oriented inward toward hub 27. Post 19 is aligned with retaining wall 20 proximal to hinged region 13. Aligned directly behind post 19 in the hinge portion 13 is block 21 so that when cover portion 12 engages with disk receiving portion 11 closing case 10, block 21 contacts post 19 forcing post 19 inward toward hub 27 thereby securing the outer circumference of media storage disk 50 with lip 22 as depicted in FIGS. 24 and 26. So long as cover portion 12 and disk receiving portion 11 are not engaged in the closed position post 19 does not engage disk 50.

[0065] Likewise, as depicted in FIG. 20, second outer retaining mechanism 23 comprises post 24 aligned with retaining wall 20 opposite but aligned with first outer retaining mechanism 18. Post 24 incorporates lip 26 which faces inward toward hub 27. Aligned directly behind post 24 on the inside of cover portion 12 is block 25 when case 10

is closed as depicted in FIG. 26. When cover portion 12 is closed thereby engaging disk receiving portion 11 block 25 contacts post 24 forcing post 24 inward toward hub 27 thereby securing the outer circumference of media storage disk 50 under lip 26 as depicted in FIGS. 24 and 25. Again, so long as cover portion 12 and disk receiving portion 11 are not engaged in the closed position, post 24 leans does not engage disk 50 to assist with securing disk 50 in case 10.

[0066] Other embodiments of the invention will appear to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the specification and examples to be considered as exemplary only, with a true scope and spirit of the invention being indicated by the following claims.

What is claimed is:

1. An apparatus for holding a compact disk having a central hole comprising:

- a body portion;
- a cylindrical hub with a diameter slightly less than said central hole of said disk within said body portion;
- at least a first arm extending radially from said hub downward toward to said body portion;
- at least a second arm extending radially from said hub which provides a hinge means between said hub and said body portion for locking and unlocking said disk;
- a finger protruding from said hub to engage said disk.

2. The apparatus in claim 1 wherein said second arm extends radially from said hub generally 180 degrees from said first arm.

3. The apparatus in claim 1 wherein said finger is aligned with said second arm.

4. The apparatus in claim 1 wherein when pressure is applied to said hub said finger retracts into said hub unlocking said disk from the apparatus.

5. An apparatus for holding a compact disk having a central hole comprising:

- a body portion;
- a cylindrical hub with a diameter slightly less than said central hole of said disk within said body portion;
- at least a first pair of arms extending radially from said hub down toward to said body portion;
- at least a second pair of arms extending radially from said hub which provides a hinge means between said hub and said body portion for locking and unlocking said disk;
- at least one finger protruding from said hub to engage said disk when in the locked position;

6. The apparatus in claim 5 wherein said first pair of arms extend radially from said hub and opposite from each other.

7. The apparatus in claim 5 wherein said second pair of arms extend radially from said hub and are generally equidistant from each arm of said first pair of arms.

8. The apparatus in claim 5 wherein said finger is aligned with each arm of said second pair of arms.

9. The apparatus in claim 5 wherein when pressure is applied to said hub said finger retracts into said hub unlocking said disk from the apparatus.

10. An apparatus for holding a compact disk having a central hole comprising:

- a disk receiving portion;
- a cover portion;
- a hinge portion between said disk receiving portion and said cover portion to permit said disk receiving portion to move relative to said cover portion to form an enclosure around said disk
- a body portion incorporated on the interior face of said disk receiving portion;
- a cylindrical hub with a diameter slightly less than said central hole of said disk within said body portion;
- at least a first arm extending radially from said hub down toward to said body portion;
- at least a second arm extending radially from said hub which provides a hinge means between said hub and said body portion for locking and unlocking said disk;
- a finger protruding from said hub to engage said disk when in the locked position;
- a first outer retaining mechanism comprising a post possessing a lip to engage the outer circumference of said disk when in the locked position located along said outer retaining wall proximal to said hinge;
- a first block located on said hinge portion aligned with said first outer retaining mechanism that when said cover portion and said disk retaining portion are engaged in the closed position encasing said disk said block contacts said post causing said lip to engage and secure the outer diameter of said disk.

11. The apparatus in claim 10 wherein said second arm extends radially from said hub generally 180 degrees from said first arm.

12. The apparatus in claim 10 wherein said finger is aligned with said second arm.

13. The apparatus in claim 10 wherein when pressure is applied to said hub said finger retracts into said hub unlocking said disk from the apparatus.

14. The apparatus according to claim 10 wherein:

- a second outer retaining mechanism comprising a second post possessing a second lip is located along into said outer retaining wall located opposite said first outer retaining mechanism and said hinge;
- a second block aligned with said second outer retaining mechanism on said cover portion that when said cover portion and said disk receiving portion are engaged in the closed position said second block contacts said second retaining mechanism causing said second lip to engage the outer circumference of said disk.

15. An apparatus for holding a compact disk having a central hole comprising:

- a disk receiving portion;
- a cover portion;
- a hinge portion between said disk receiving portion and said cover portion to permit said disk receiving portion to move relative to said cover portion to form an enclosure around said disk

- a body portion incorporated on the interior face of said disk receiving portion;
- a cylindrical hub with a diameter slightly less than said central hole of said disk within said body portion;
- at least a first pair of arms extending radially from said hub down toward to said body portion;
- at least a second pair of arms extending radially from said hub which provides a hinge means between said hub and said body portion for locking and unlocking said disk;
- a finger protruding from said hub to engage said disk when in the locked position;
- a first outer retaining mechanism comprising a post possessing a lip to engage the outer circumference of said disk when in the locked position located along said outer retaining wall proximal to said hinge;
- a first block located on said hinge portion aligned with said first outer retaining mechanism that when said cover portion and said disk retaining portion are engaged in the closed position encasing said disk said block contacts said post causing said lip to engage and secure the outer diameter of said disk.

- a second outer retaining mechanism comprising a second post possessing a second lip is located along into said outer retaining wall located opposite said first outer retaining mechanism and said hinge;
 - a second block align with said second outer retaining mechanism on said cover portion that when said cover portion and said disk receiving portion are engaged in the closed position said second block contacts said second retaining mechanism causing said second lip to engage the outer circumference of said disk.
- 16.** The apparatus in claim 15 wherein said first pair of arms extend radially from said hub and opposite from each other.
- 17.** The apparatus in claim 15 wherein said second pair of arms extend radially from said hub and are generally equidistant from each arm of said first pair of arms.
- 18.** The apparatus in claim 15 wherein said a finger is aligned with each arm of said second pair of arms.
- 19.** The apparatus in claim 15 wherein when pressure is applied to said hub said finger retracts into said hub unlocking said disk from the apparatus.
- 20.** The apparatus in claim 15 wherein each of said second pair arms is shorter than each of said first pair of arms.

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