



US 20170079412A1

(19) **United States**(12) **Patent Application Publication**
Romero(10) **Pub. No.: US 2017/0079412 A1**(43) **Pub. Date: Mar. 23, 2017**(54) **METHOD, APPARATUS AND SYSTEM FOR
FRONT ACCESS BACKPACK**(52) **U.S. Cl.**CPC *A45F 3/04* (2013.01)(71) Applicant: **Frank Romero**, Vallejo, CA (US)(72) Inventor: **Frank Romero**, Vallejo, CA (US)(21) Appl. No.: **14/859,120**(22) Filed: **Sep. 18, 2015****Publication Classification**(51) **Int. Cl.***A45F 3/04*

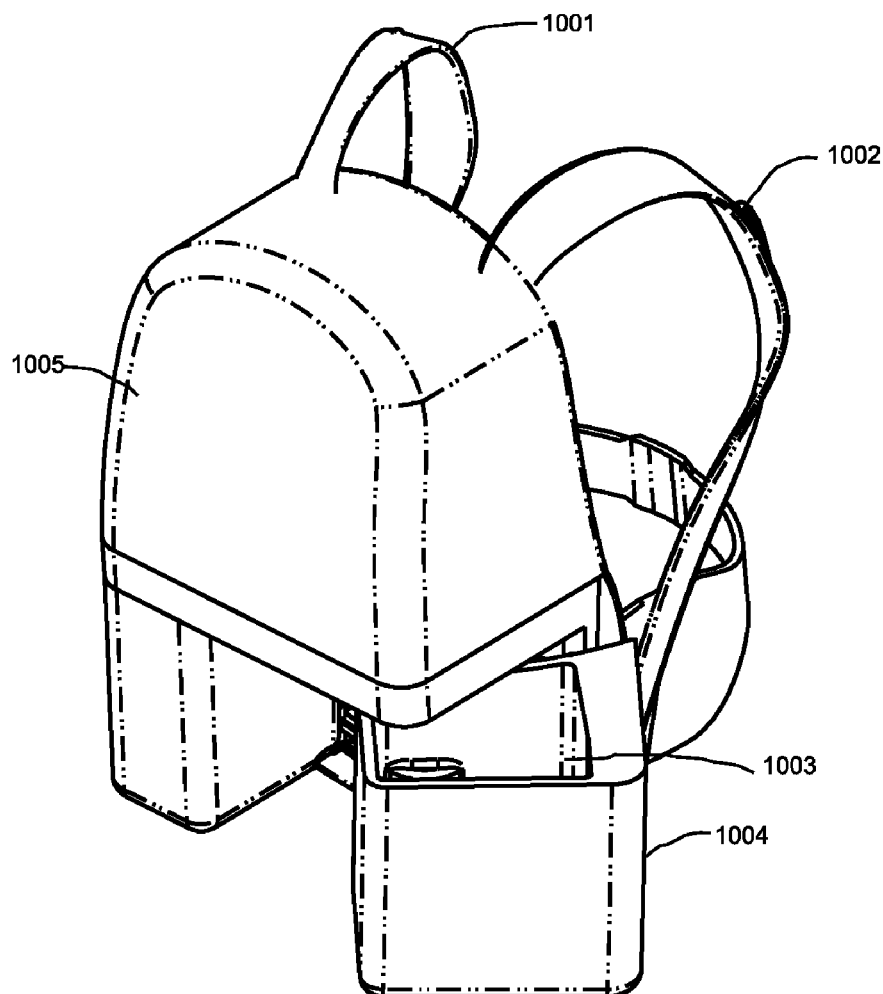
(2006.01)

(57)

ABSTRACT

A side access back pack design is proposed which is fully mechanized. Through a user trigger, a vital portion of the storage compartment mechanically moves out, pivots and linearly traverses towards the front and side of the user. The storage compartment is designed to carry critical equipment that a user wishes to access quickly without a need to unshoulder the back pack and access it in non-wear mode which has several disadvantages, including inconvenience and loss of time. After use of the critically accessed equipment, again on user trigger, the storage compartment retracts and folds itself within the contours of a regular backpack.

1000



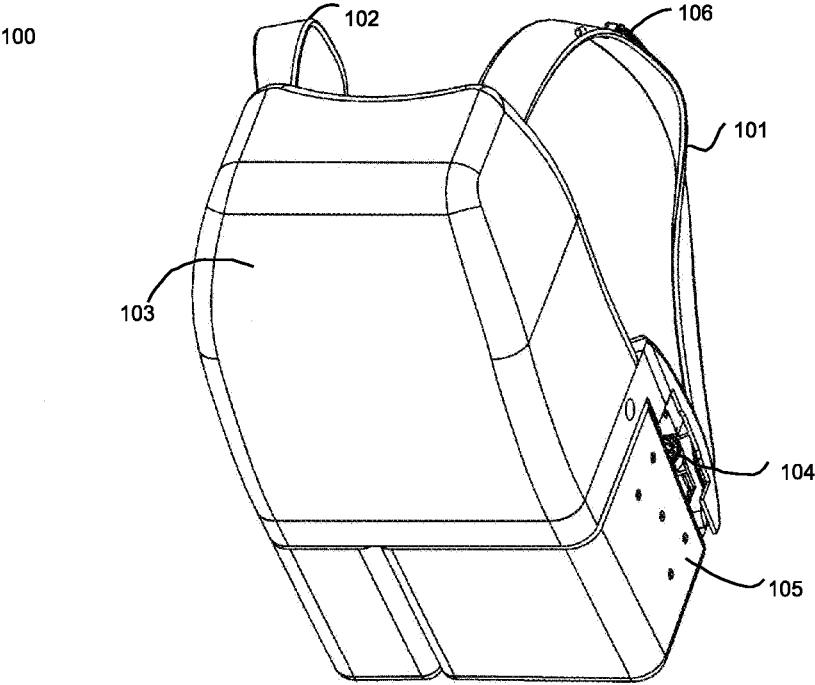


FIGURE 1

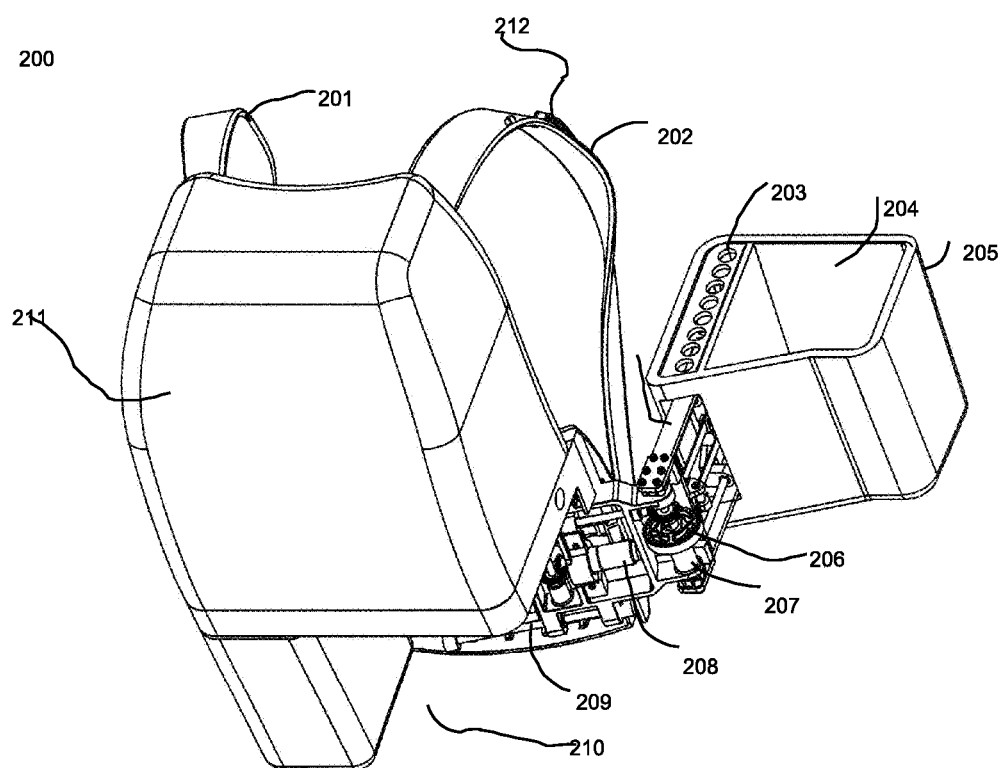


FIGURE 2

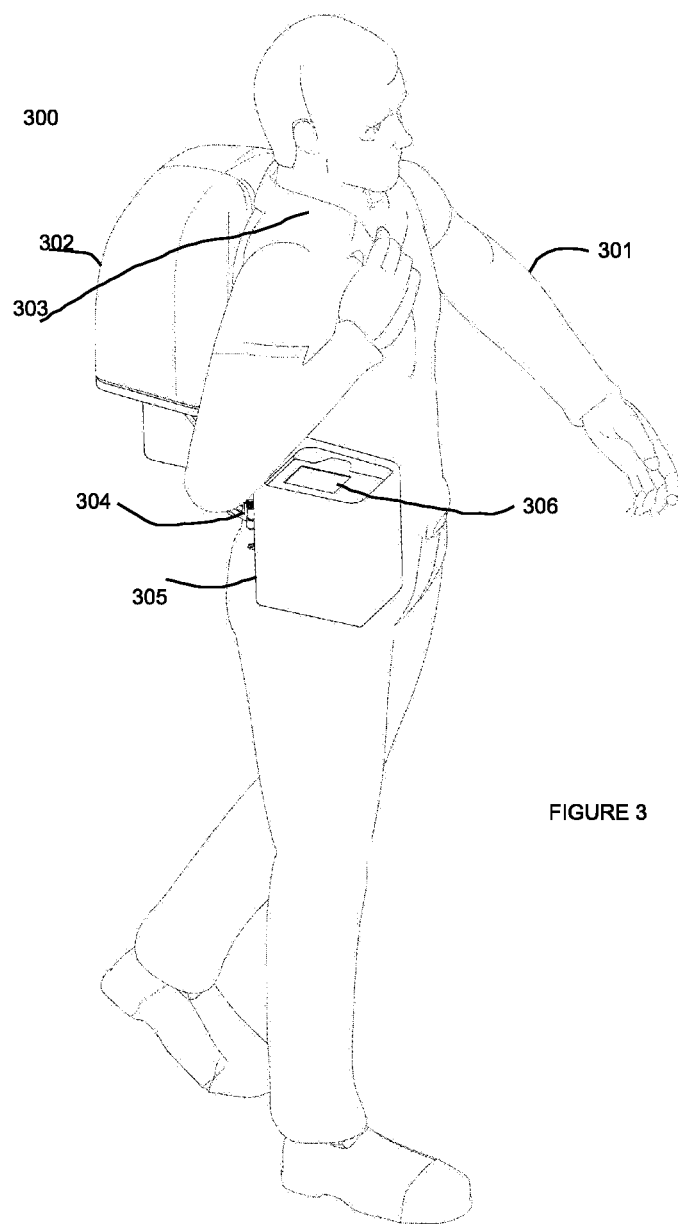


FIGURE 3

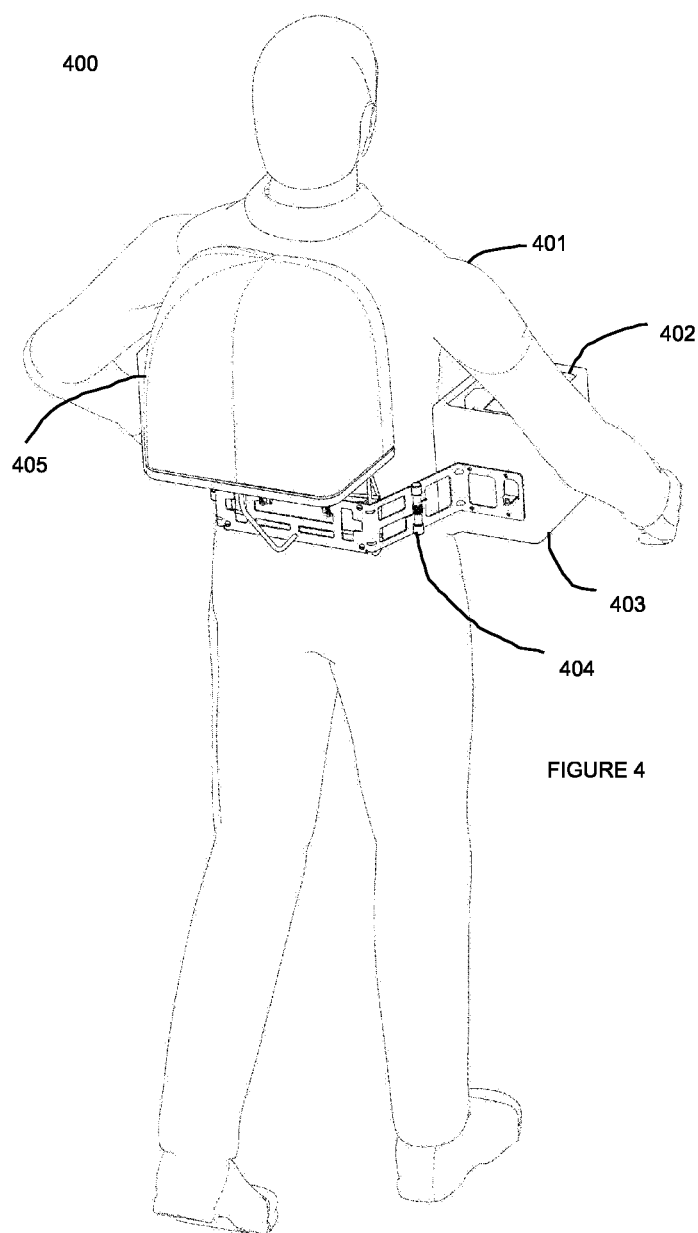


FIGURE 4

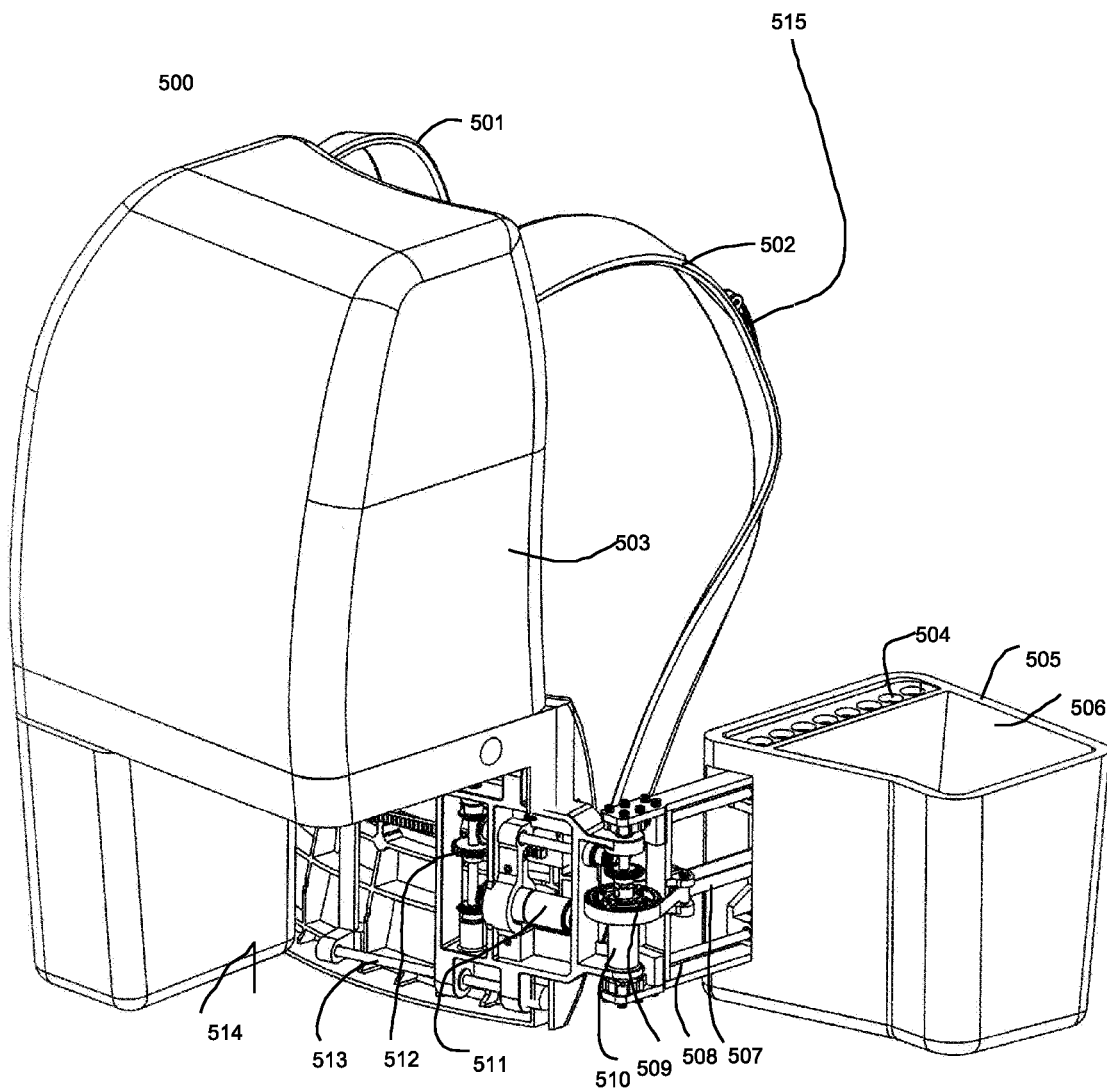


FIGURE 5

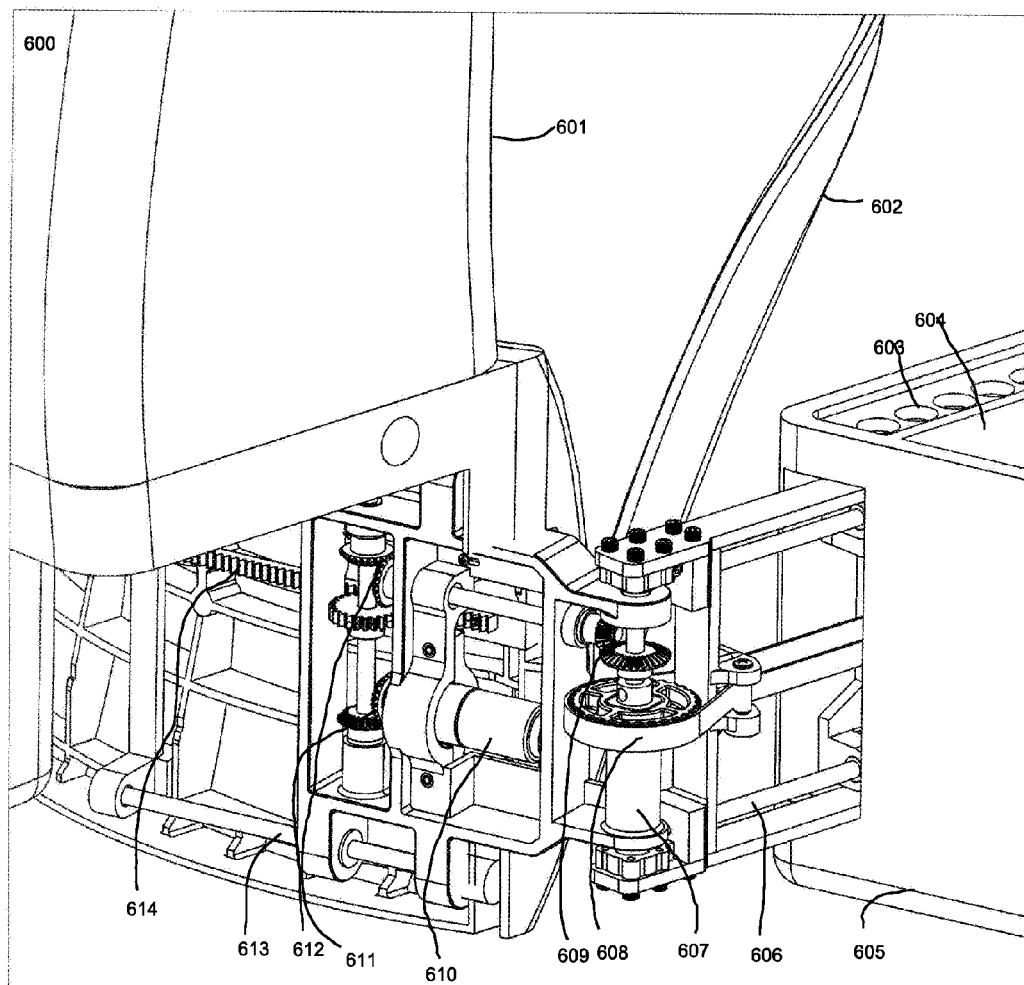


FIGURE 6

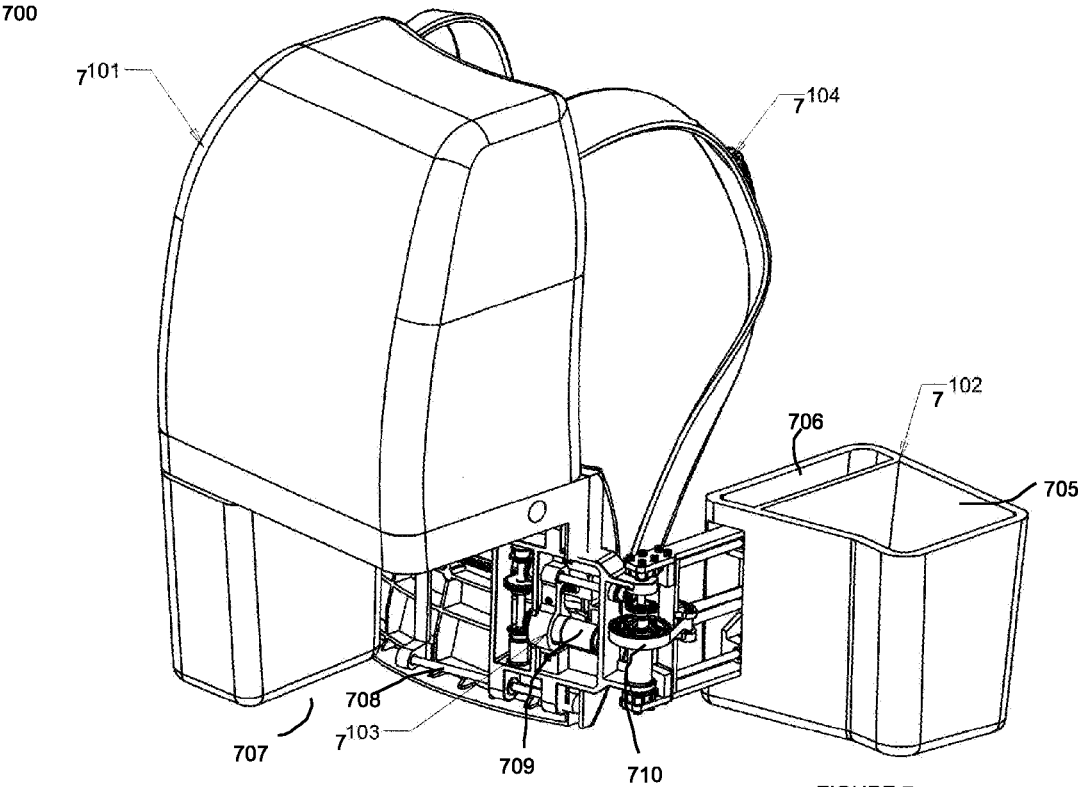


FIGURE 7

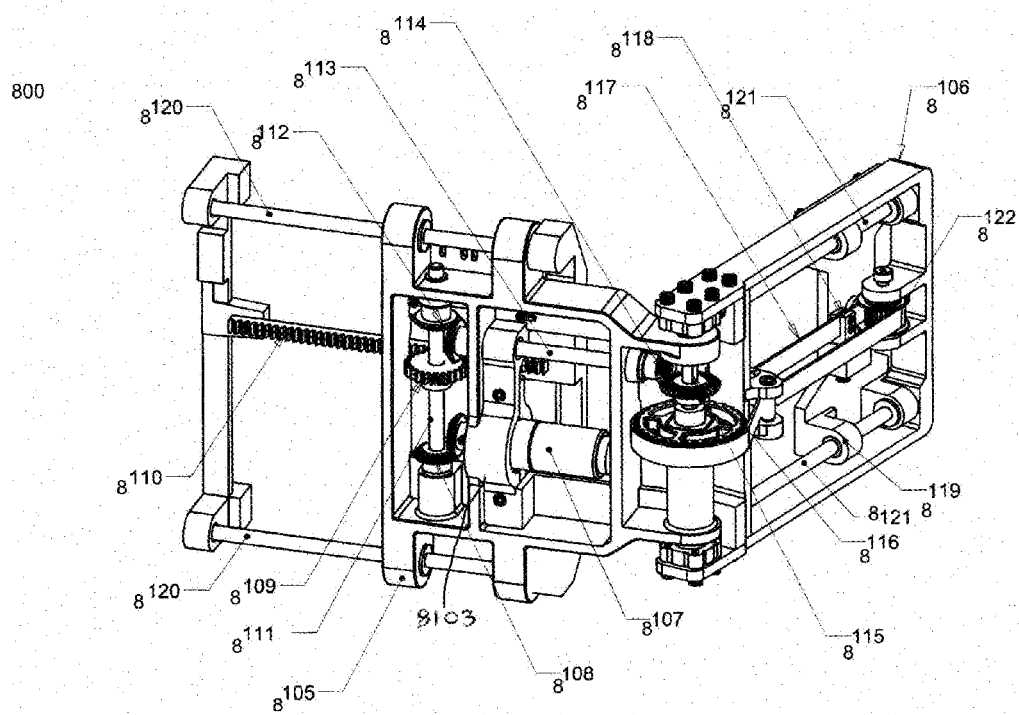


FIGURE 8

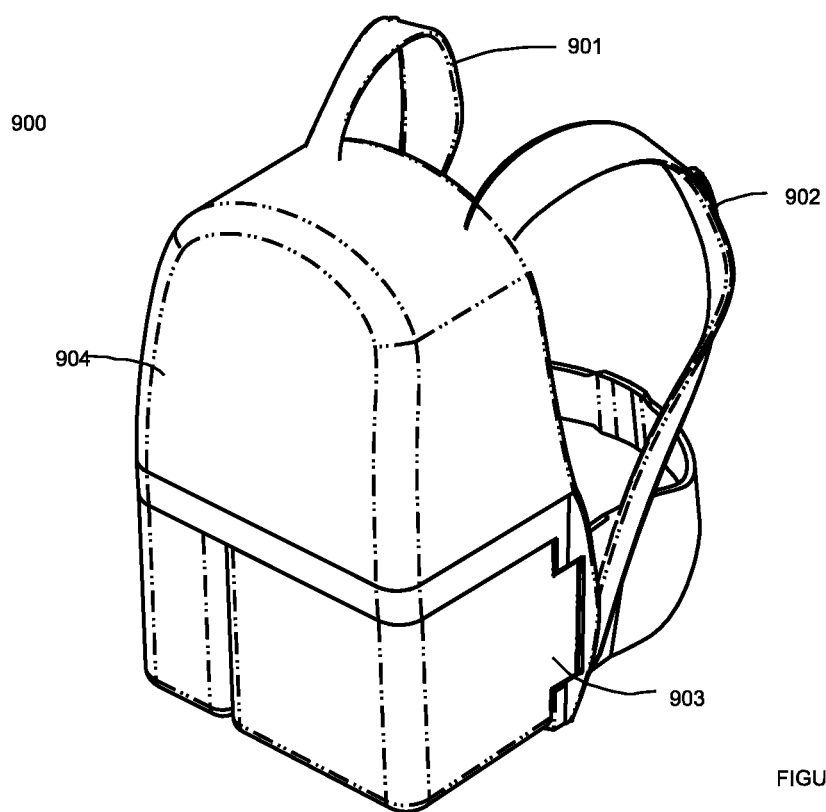


FIGURE 9

1000

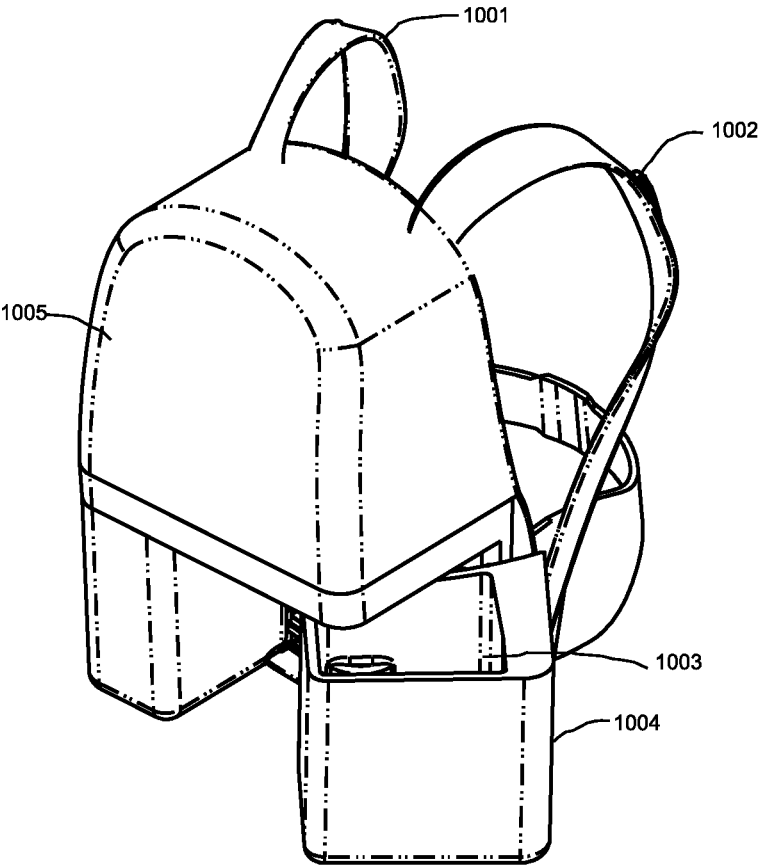


FIGURE 10

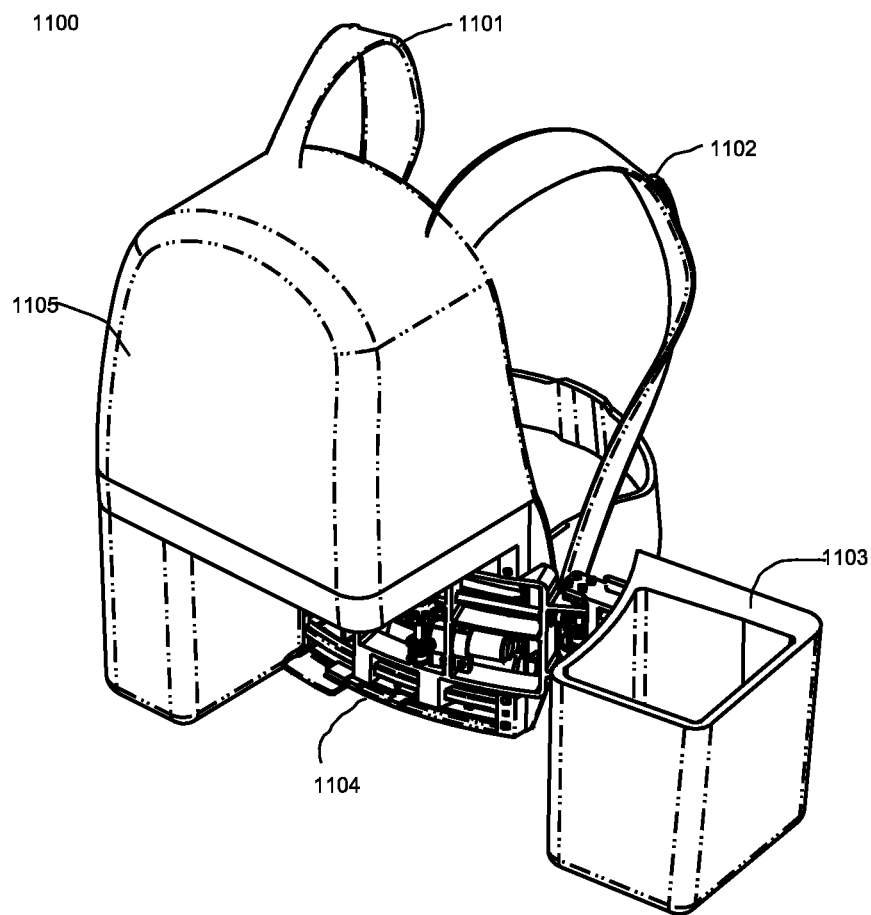


FIGURE 11

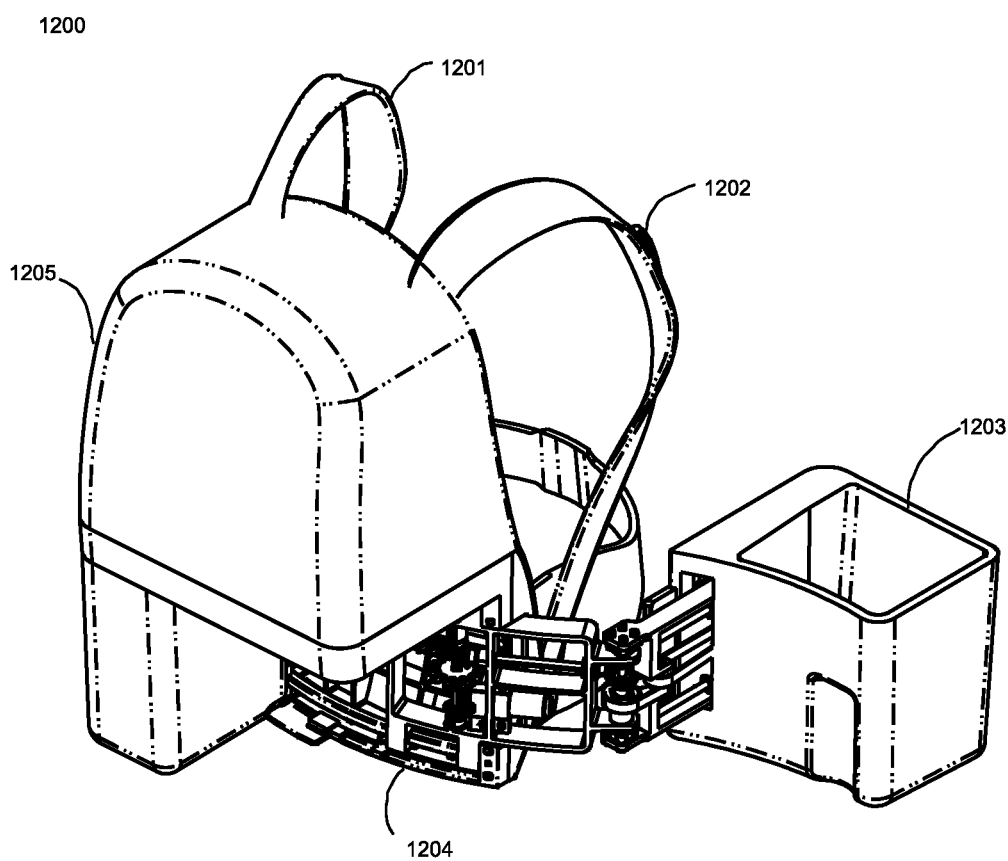


FIGURE 12

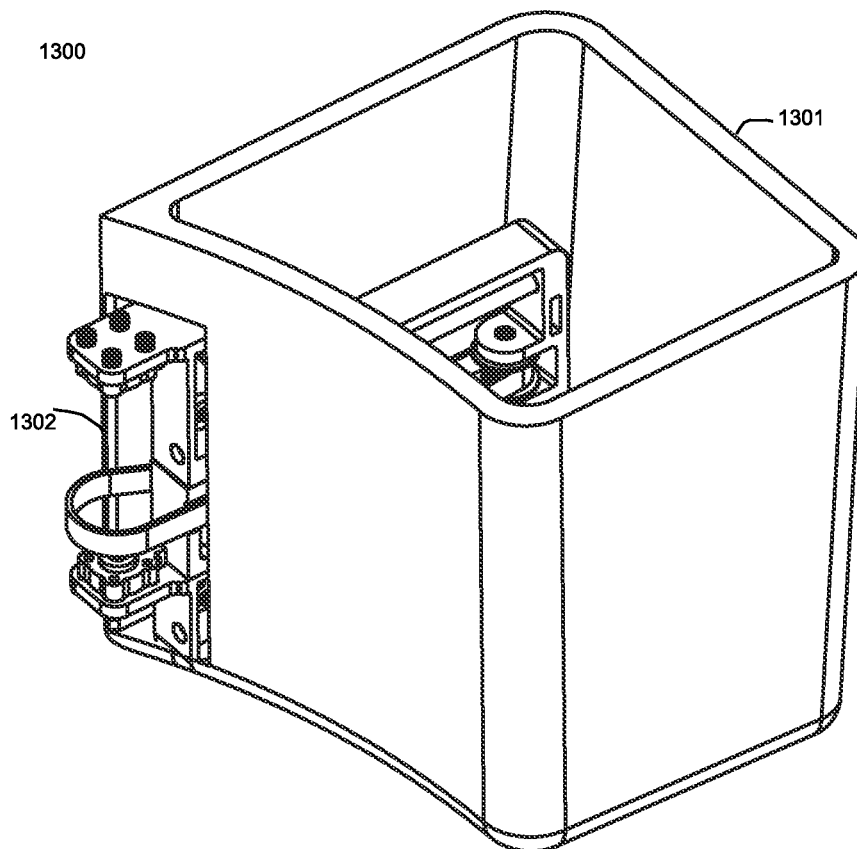


FIGURE 13

Storage container in fully retracted position

The holes on the retaining wall and the barrier is removed.

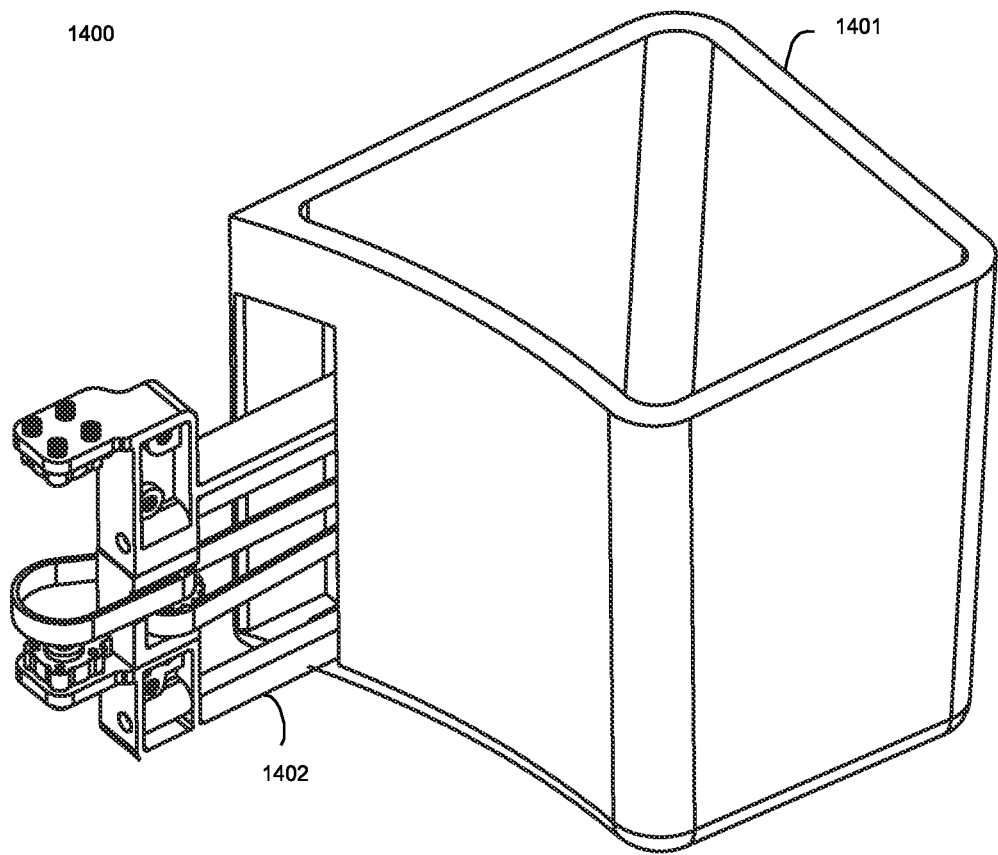
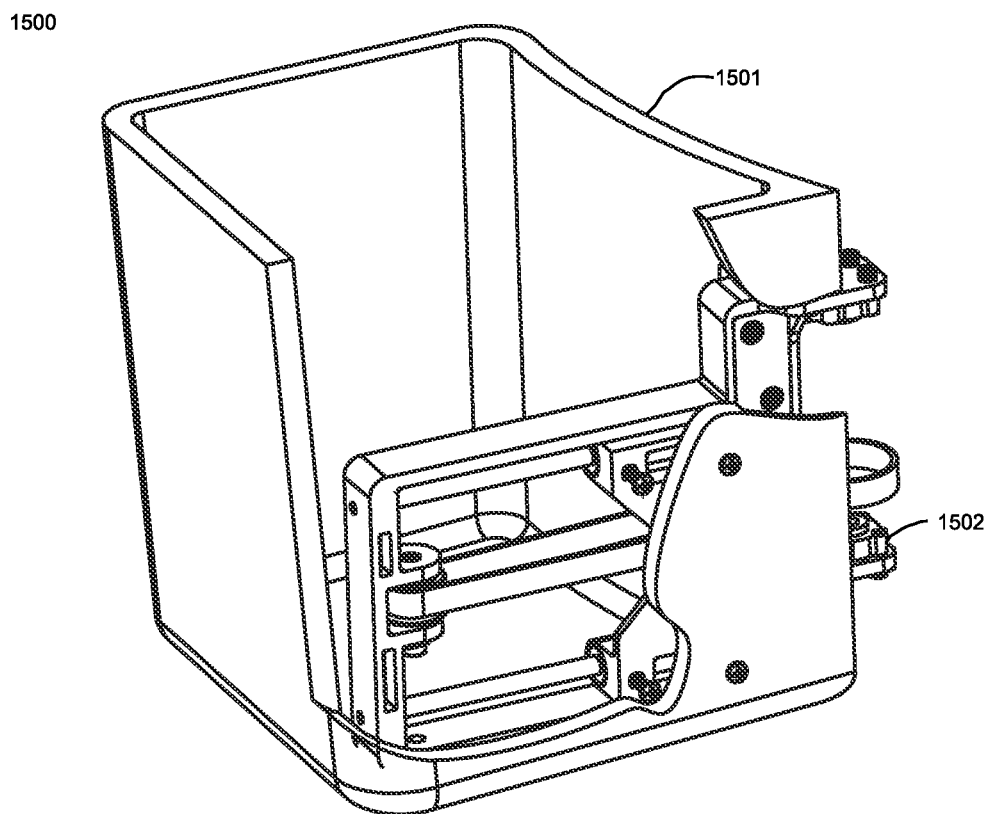


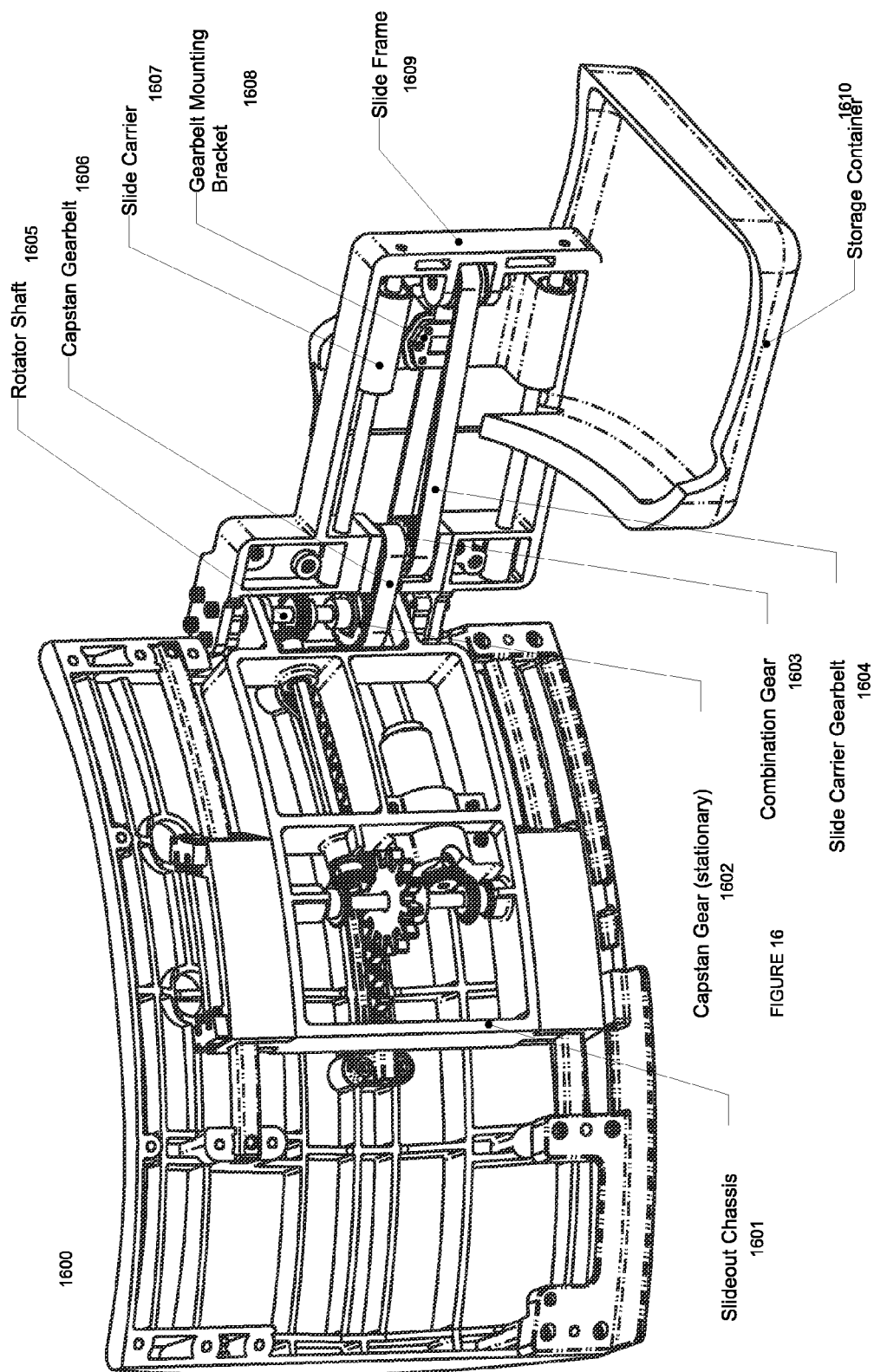
FIGURE 14

Storage container in fully
extended position



Alternate view of container in fully retracted position. Container is attached to the slide rail carrier block.

FIGURE 15



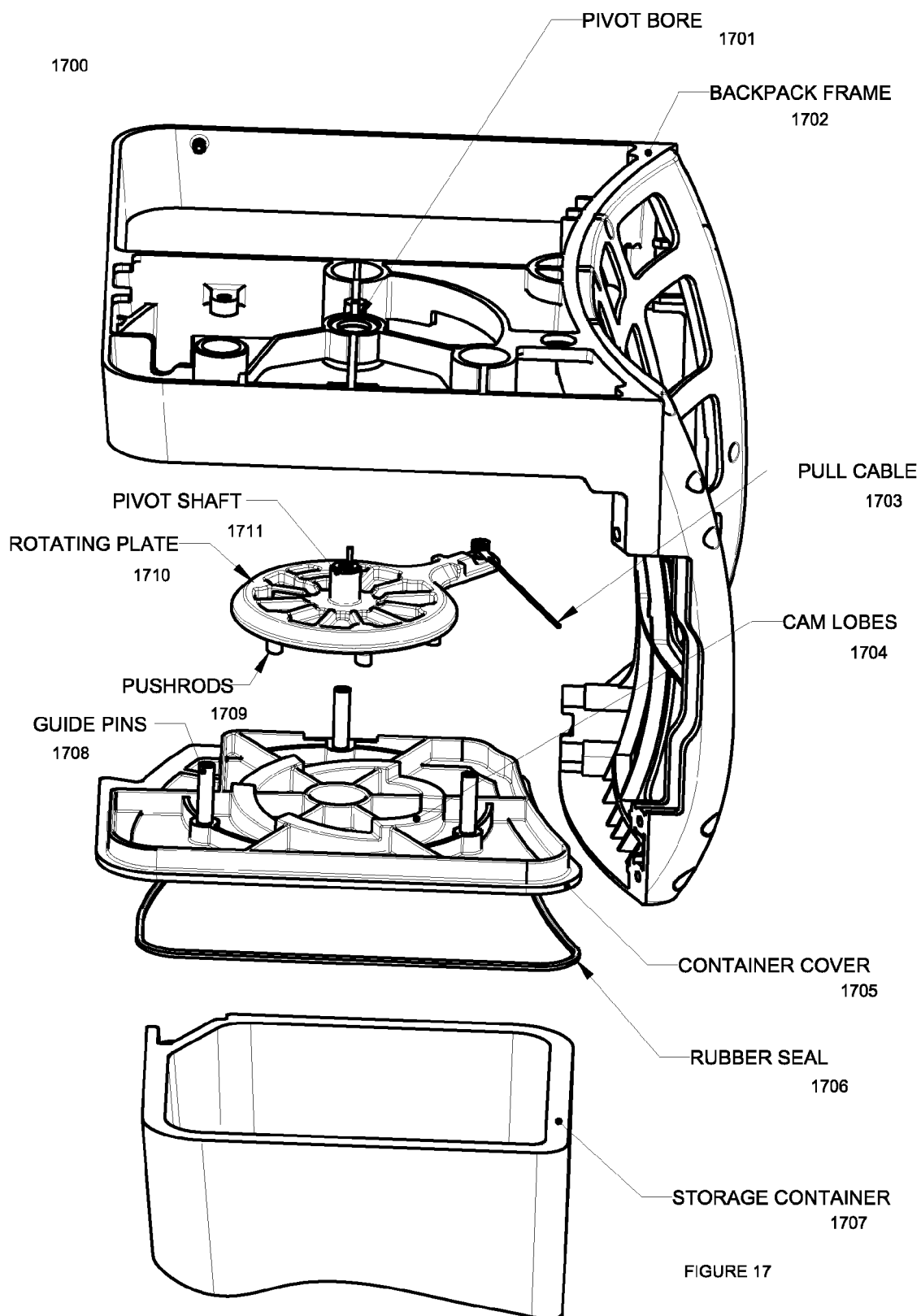


FIGURE 17

METHOD, APPARATUS AND SYSTEM FOR FRONT ACCESS BACKPACK

TECHNICAL FIELD

[0001] This invention relates to design of backpacks. Backpacks suffer from a limitation of use and convenience since access for stored items requires unshouldering it, yielding it to the front and with one hand holding it, the other hand is used to access the objects. This invention overcomes this limitation by providing a side and front access to critical objects by mechanical design so that a portion of the storage compartment, attached to the backpack, mechanically moves out, pivots and linearly moves to the side and front for easy equipment access.

BACKGROUND OF THE INVENTION

[0002] Backpacks are popular carriers of equipment, goods, food, water and travel gadgets. Their main advantage stems from the fact that the entire weight of the goods when in the backpack and worn, is offloaded onto the shoulders and likely the strongest portion of the human skeleton. It also makes both hands of the individual to be free to run, do necessary work or carry additional objects, hold hands in a crowd etc. When travelling, the freeing of the hands makes it easy to get into a train, a bus. It is possible to ride a bicycle with weight carried on the shoulder. Some more professional forms of the backpacks are used by mountaineers, hikers to carry supplies, clothing, tools, water, oxygen and food. Armed forces use similar backpacks for the same purpose, to carry supplies and food while keeping hands free to use weapons, engage in combat or to perform daily chores and activities.

[0003] While backpacks are very useful as described above, they suffer from a serious limitation. To access the backpack, since it is located on the back, the user has to un-deploy it, use the hands, one to hold it and another to open zips and locks to access the contents of the bag. Since use of hands and un-deploying is required, the user has to essentially stop the activity he or she was engaging in. User has to either use one hand to hold and other to access or look for an external support on which the bag can be placed. Often, for want of this support, the backpack is placed on the ground, which forces the user to bend and stress the back. Lift of the entire load is required to redeploy the bag. These disadvantages have been attempted to be overcome by several designs.

[0004] Photographers who wish to have easy and quick access to the camera have considered a joint waist bag and backpack design. However when both are used simultaneously, one of them interferes with the other. Where a retractable storage container is made accessible over the head of the user, the container is essentially turned upside down, requiring contents to be tied to the container to prevent a fall. Manipulation of storage containers from the backpack requires repositioning of the shoulder straps. Users have attempted to replace the backpack with a waist bag, but the waist bag due to its placement is not ideal to carry heavy weight if at the back. If it is in the front, the bulk of the storage container interferes with the user as it is directly in front of him. Some solutions have used metal frames and through use of a latch, a portion of the container (swing-around portion) opens up and moves towards the front. Due to the interference of the straps and the metal

frame, the arrangement becomes cumbersome and messy. Accordingly, a fully mechanized and/or motorized version of the deployment and un-deployment towards the side and front of the user will be an enhancement of the prior art and overcome the shortcomings described.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 shows an illustration of an embodiment of the newly invented backpack with traditional straps, regular holding compartment, a moving storage compartment capable of sliding, pivoting and moving forward and the mechanical apparatus embedded within the contours of the bag.

[0006] FIG. 2 illustrates the same embodiment with straps, holding compartment and the storage compartment deployed in a slid, pivoted and moved forward position. The user can, without taking off the bag, access the contents of the moved storage compartment.

[0007] FIG. 3 illustrates the side isometric view of a user carrying an embodiment of the newly invented backpack with the moving storage compartment slid, pivoted and on the side. For a right hand user, the compartment is presently accessible without any un-deployment, bending or using any external support.

[0008] FIG. 4 is a diagram illustrating the user in a back isometric view with an embodiment of the backpack deployed and engaged to be accessible from the front. The user is upright, moving and has both hands free as the storage compartment is available towards his right.

[0009] FIG. 5 shows an embodiment of the invention with the backpack itself displayed with straps, holding compartment, storage compartment and various components of the mechanical and electrical assembly involved in the engagement and disengagement of the movable storage compartment.

[0010] FIG. 6 shows an embodiment of the invention with zoomed in view of the electro-mechanical system involved in slide out, pivot and side to front movement. Using 1:1 ratio gears and gear belt, the motorized circular movement is converted into two linear movements and a pivot movement of the storage compartment.

[0011] FIG. 7 shows another embodiment of the backpack with two compartments in the movable storage box and also shows the electro-mechanical apparatus involved in effectuating a switch based deployment and engagement and disengagement of the storage compartment.

[0012] FIG. 8 is an embodiment only of the electro-mechanical components that are vested within the contours of the backpack and effectuate the two sideways movement and the single pivot movement. The apparatus comprises of fixed ratio gears, gear belt and slide beams over which the motorized circular movement is used to create a three way move of the components, with a storage component attached to the apparatus.

[0013] FIG. 9 is an embodiment of the invention where the backpack is in a fully un-deployed and disengaged position. The user would carry normally in this position. In one embodiment, the user wears the backpack using the straps. The user has already pre-packed the storage compartment with critical equipment that he/she wishes to access quickly and without taking off the straps. This could be camera equipment, cell phone, keys of automobile, safety weapon, food, tickets and even a wallet.

[0014] FIG. 10 is an embodiment of the invention, where, based on the user trigger which initiates the motor, the storage component is seen to make two movements, the pivot and slide out movement to get the compartment beyond the contours of the backpack.

[0015] FIG. 11 illustrates an embodiment of the invention where two of the three movements have completed. In one embodiment, the storage compartment has pivoted and slid out from under the regular compartment of the backpack and begun to move forward, all simultaneously. In another embodiment, the motions may be fully serialized or be in part serial and in part parallel.

[0016] FIG. 12 shows an embodiment of the invention where all three conceived motions from the single circular motion of the motor are now complete. The storage compartment has pivoted, slid out and also moved parallel and side ways to come in from and side of the user. In this position, critical equipment is accessed by the user, the equipment is made to use, it is replaced in the storage component and trigger pressed to revert all three motions that had occurred during deployment and engagement.

[0017] FIG. 13 to FIG. 15 show various views of the “quick access compartment” mounted on the sliding chassis in a fully deployed position and in a fully retractable position.

[0018] FIG. 16 provides another detailed view of the electro-mechanical system with major components marked. Whereas an electrical motor is placed, the motions can be effectuated through springs. In another embodiment, the motions can be effectuated manually through use of a handle to generate the motorized circular motion.

[0019] FIG. 17 illustrates a waterproof mechanism for the “quick access container” when it is in retracted position, tucked within the backpack frame. The mechanism and apparatus alleviates concerns regarding water leakage when part of the backpack opens up and is accessed from the front.

DETAILED DESCRIPTION

[0020] In the following description specific details are set forth describing certain embodiments. It will be apparent, however, to one skilled in the art that the disclosed embodiments may be practiced without some or all of these specific details. The specific embodiments presented are meant to be illustrative, but not limiting. One skilled in the art may realize other methods, apparatus or systems that, although not specifically described herein, are within the scope and spirit of this disclosure.

[0021] FIG. 1 100, in one embodiment, illustrates the backpack design with quick front access features. The bag is a typical backpack with straps 101 102 and regular fixed container 103. The quick access container 105 is un-deployed and disengaged. The apparatus includes the electro-mechanical system 104 which is triggered through the use of a user triggered switch 106. When the apparatus for quick access is not deployed, the backpack has regular contours and appears to be a regular backpack. The user has already kept his critical equipment, tools or items in the quick access container, but has not yet deployed the mechanism for quick access. In one embodiment, the backpack is made out of cloth, fabric, waterproof fabric or thick plastic. In another embodiment, the backpack may be made out of suitcase material including metal, thick plastic, leather or other

material used for luggage. The electro-mechanical apparatus and system is made mountable on any of these materials for front access.

[0022] FIG. 2 200, in one embodiment presents the backpack with its enhanced features in an isometric view from the back of the user. The backpack is still wearable through straps 201 and 202 and has regular fixed container 211. The space 210 represents the three dimensional space where the “quick access container” retracts when un-deployed. The quick access container 205 has a big compartment 204 and small cylindrical spots 203 to keep the critical items. The quick access container 205 is mounted on the slide out chassis. In one embodiment, part of the electro-mechanical apparatus is shown with a gear pulley 206, rotator shaft 207, gear motor 208. In another embodiment, the electric motor may be replaced by a manual mechanism driven by a handle. In yet another embodiment, the circular movement may be generated through springs. The slide out shaft 209 effectuates the outwards linear movement. The mechanism is deployed using the user triggered switch 212. The quick access container 205 has already pivoted 180 degrees so that it has oriented itself outwards and created empty space 210 where it will retract after a reverse pivot and slide in.

[0023] FIG. 3 300 illustrates the deployed backpack in the field with the user actually wearing the backpack. User 301 uses straps 303 to wear the bag with regular fixed container 302. The quick access container 305 has slid out, pivoted and moved forward to be accessible by the user 301. A critical holding area 306 is depicted on the quick access container 305. Partial view of the electro-mechanical apparatus is shown from a side isometric view 304. Due to the added feature of fast and front access, the user is still walking with critical equipment accessible through the use of the switch with his right hand (on the strap). The user 301 did not have to un-wear the backpack, bring it to the front with both hands and did not have to use external support as the backpack remains supportable from the shoulder. No waist bag straps are needed in the belt area and the user remains absolutely free to use the equipment. In this embodiment, the “quick access container” is accessed from the right side. In another embodiment, it could be on the left or on both sides as a natural projection.

[0024] FIG. 4 400 illustrates the same deployed and engaged backpack from the back of the user 401. The backpack is shoulder mounted with regular container 405. The “quick access container” 403 with compartment 402 have been deployed for front access after a proper pivot of 180 degrees over axis 404. The user 401 is walking, did not have to bend, or use the hands to access the container. The container comes to the front from the side, making it convenient for the user to perform a number of tasks with the frontal access still deployed.

[0025] FIG. 5 500 is one embodiment of the new design of the backpack with detailed isometric view to show all important components when the backpack is not worn by the user. The backpack has two straps 501 502 with a trigger switch 515 on the right strap. The backpack has regular fixed container 503. The “quick access container” 505 has two customized compartments 504 506. Due to the 180 degree pivot, a cavity 514 is created under the main cabin of the backpack. The side shift shaft 513 is used to effectuate side wards movement using gears 512 and gear rack. The gear motor 511 creates three types of motions, all simultaneously. The gear pulley 509 using the gear belt 507 effectuates a

forward movement of the “quick access container.” The movement occurs on yet another slide shaft **508**. The pivot occurs around the rotator shaft **510**.

[0026] FIG. **6 600** shows the electro-mechanical apparatus in more detail and an isometric zoomed view. The backpack has a regular container **601**. It has straps **602** and a wire going from the switch located on the right strap to the electronic motor **610** which moves the gears **611 612 609**. The gear pulley **608** with the use of a gear belt moves the “quick access container” **605** with containers **603 604**. The linear shafts **613 609 606** provide the axis and framework for the side movement and the pivot. The gear rack **614** converts a circular gear movement to a linear one.

[0027] FIG. **7 700** represents another isometric back view of the backpack with the electro-mechanical apparatus. Switch **7104** is installed on the right strap. The backpack has regular carrying carton **7101**. The “quick access container” **7102** is engaged and deployed and shows containers **706** and **705**. The container has pivoted 180 degrees and moved forward along the rotator shaft. A cavity **707** is created due to sideways and forward movement where the “quick access container” will retract. The gear motor **709** moves the linear slide mechanical assembly **7103**. The sliding shaft **708** provides the framework for the outwards sideways movement. Gear pulley **710** through the use of gear belt moves the “quick access container” forward.

[0028] FIG. **8 800** in one embodiment illustrates the electro-mechanical apparatus involved in the user triggered deployment and engagement of the quick access mechanism for the backpack. The sliding mechanism assembly **8103** is attached to the “slide out chassis” **8105**. Similar to a “slide out chassis” **8105**, a quick access container chassis **8106** is also provided over which the “quick access container” is installed. A single electrical motor **8107** is provided with various mechanical systems to convert a single rotary motion of the motor to two sliding motions and one pivot motion for the “quick access container.”

[0029] In one embodiment, through Miter gear set **1 8108** with one to one ratio, the drive shaft **8111** and the pinion gear **8109** are turned, which through the use of gear rack **8110**, is converted into a slide out movement. In one embodiment, through a second Miter gear set **2 8112** at one to one ratio, the traverse shaft is turned which has a Bevel gear set **8114** at one to two ratio which turns the rotator shaft. The entire quick access container chassis **8106** turns 180 degrees on the rotator shaft. Initially, in the un-deployed position, the chassis **8106** is located perpendicular to the slide out chassis **8105**. Through the rotator shaft, it is first rotated ninety degree and then another ninety degree to make the container installed on it accessible. It is still perpendicular to the “slide out chassis,” but has now opened out away from the backpack main container for it to be accessible by the user. Through the use of a gear pulley **8115** and gear belt **8117**, the “quick access container chassis” **8106**, carrying container carriage frame **8119** moves towards the front on the “linear slide shaft” **8121**. The gear belt is mounted on gear belt mounting bracket **8118** and kept in place.

[0030] The backpack quick side (left or right) access by the wearer is accomplished by three distinct and simultaneous motions. The first such motion in one embodiment comprises of the slide mechanism assembly **8103** a “quick access container” **7102** sliding out towards the side. The second such motion involves item **7102** pivot 180 degrees on rotator shaft **8115**. The third motion involves gear belt

8117 engaged around stationary pulley gear **8116** drive the container carriage frame **8119** forward. Since all these motions are triggered through a motor **8107**, the motions occur simultaneously. In one embodiment, the simultaneous motions also reduce the time to deploy and engage as well as un-deploy and disengage. Although in all embodiments, the “quick access container” is shown on the right side of the user, in another embodiment, it could be on the left side. In yet another embodiment, the same motor may be used to control two or a plurality of containers, particularly on the left and right side.

[0031] In one embodiment, the slide mechanism assembly **8103** works through gear motor **8107** driving the Miter gear set **1 8108** through drive shaft **8111**. It also turns Pinion gear **8109** engaged with gear rack **8110** to move the assembly towards the side. Simultaneously, in one embodiment, the Miter gear set **2 8112** turns traverse shaft **8113**. Traverse shaft **8113** in turn through the use of bevel gear set **8114** turns the rotator shaft **8115**.

[0032] FIG. **9 900** represents an embodiment of the backpack with straps **901** and switch **902** installed on the right strap. The “quick access container” **903** is retracted and the backpack is in a disengaged and un-deployed position. The backpack has regular fixed container **904**.

[0033] FIG. **10 1000** shows the same backpack in a partially deployed position as the three simultaneous motions are now underway in response to operation of the user who deployed the front access mechanism. There is an outward movement, a pivot movement of the storage container and a forward movement of the “quick access container. **1004**” The compartment **1003** is used to store critical equipment. The backpack has the regular fixed compartment **1005** and is wearable using strap **1001** and a user operable switch **1004**.

[0034] FIG. **11 1100** shows the same backpack in a partially deployed position as the three simultaneous motions are now underway in response to operation of the user who deployed the front access mechanism. There is an outward movement, a pivot movement of the storage container and a forward movement of the “quick access container. **1103**” These movements, which were partial in FIG. **10** have now completed. The cavity **1104** is used to store the “quick access container” when it is un-deployed. The backpack has the regular fixed compartment **1105** and is wearable using strap **1101** and a user operable switch **1104**.

[0035] FIG. **12 1200** shows the same backpack in a fully deployed position as the three simultaneous motions are now completed in response to operation of the user who deployed the front access mechanism. There is an outward movement, a pivot movement of the storage container and a forward movement of the “quick access container **1203**.” These movements, which were partial in FIG. **10** and FIG. **11** have now completed. The electro-mechanical apparatus **1204** is used to move and deploy the “quick access container.” The backpack has the regular fixed compartment **1205** and is wearable using strap **1201** and a user operable switch **1202**.

[0036] FIG. **13 1300** shows the “quick access container” **1301** mounted on the chassis as it is moved using the gear, gear belt and motorized mechanisms. The partial electro-mechanical system **1302** is shown when the container is retracted.

[0037] FIG. **14 1400** shows the “quick access container” **1401** mounted on the chassis as it is moved using the gear,

gear belt and motorized mechanisms. The partial electro-mechanical system **1402** is shown when the container is fully extended.

[0038] FIG. **15** **1500** is an alternate view of the storage container in a fully retracted position. The container is attached to the slide rail carrier block. Both the container **1501** and the electro-mechanical apparatus **1502** (partial) is shown.

[0039] FIG. **16** **1600** is an alternate view of the electro-mechanical apparatus where the slide out has occurred, the pivot has occurred by 45 degrees and the slide out to front has not yet completed. The slide frame **1609** is attached to the rotator shaft **1605**. As the rotator shaft turns, it rotates the slide frame **1609** with it. However, the stationary capstan gear **1602** is grounded to the slide out chassis **1601** and does not rotate with the shaft. This stationary capstan gear **1602** allows the combination gear **1603** to rotate from it using the capstan gear belt **1606**. It has to be observed that the capstan is stationary and does not move but the combination gear rotates from it. The storage container **1610** moves as a result of being mounted on the electro-mechanical apparatus. The slide carrier gear belt **1604** is grounded to the slide carrier **1607** by the gear belt mounting bracket **1608**. As the combination gear **1603** rotates, it then moves the slide carrier **1607** and the storage container **1610** to the fully extended position or vice versa.

[0040] FIG. **17** is a detailed illustration of water proof design despite the fact that part of the backpack opens up and becomes front accessible. When the quick access container is retracted, by a manual mechanism, a rubber seal is tightened and force equally distributed by special method and apparatus. The backpack frame **1702** has a pivot bore **1701** to connect to a pivot shaft **1711**, rotating plate **1710**. The plate rotates through the use of pull cable **1703**. The rotating plate **1710** has push rods **1709** that get inserted using guide pins **1709** into cam lobes **1704** which form a part of container cover **1705**. The container cover presents a rubber seal **1706** that is pressurized equally in all directions through the container cover. The container cover **1705** with rubber seal **1706** is placed and tightened over the "quick access container" **1707**. The pull cable **1703** makes the rotating plate **1710** push the container cover **1705** against the storage container **1707**, and compressing the rubber seal **1706**. The force is equally distributed around the storage container lid and completes a waterproof seal.

[0041] The illustrations of embodiments provided above are exemplary only and are not intended to be limiting. One skilled in the art may readily devise other systems consistent with the disclosed embodiments, which are intended to be within the scope of this disclosed. As such, the invention is only limited by the claims.

What is claimed is:

1. A backpack system, comprising:

- a back portion comprising of a regular holding space, a base wearable on a user's back using two shoulder straps for carrying the system on a user's back and;
- a plurality of front access storage compartments mounted on a plurality of sliding chassis attached to the base and;
- a mechanical system to mount a plurality of sliding chassis on a plurality of a second set of sliding chassis and;

a mechanical and electrical system to move a plurality of storage compartments sideways outward, rotate on a pivot and sideways forward for frontal access.

2. The backpack system of claim 1 comprising a single first sliding chassis, a single second sliding chassis and a single storage compartment.

3. The backpack system of claim 1 where frontal access is at least from the right side or left side.

4. The backpack system of claim 1 where electrical and mechanical apparatus comprises of an electric motor, a switch, a plurality of gears of a plurality of ratios and a plurality of sliding and rotating shafts.

5. The backpack system of claim 1 where the mechanical apparatus comprises a waterproofing rubber seal, storage compartment cover pressed over the storage compartment using rotating plate and pull cable.

6. The backpack system of claim 1 where the two sideways and one rotate movement occur simultaneously.

7. A backpack method, comprising:

a back portion comprising of a regular holding space, a base wearable on a user's back using two shoulder straps for carrying on a user's back and;

a plurality of front access storage compartments mounted on a plurality of sliding chassis attached to the base and;

a method to mount a plurality of sliding chassis on a plurality of a second set of sliding chassis and;

a method to move a plurality of storage compartments sideways outward, rotate on a pivot and sideways forward for frontal access.

8. The backpack method of claim 7 comprising a single first sliding chassis, a single second sliding chassis and a single storage compartment.

9. The backpack method of claim 7 where frontal access is at least from the right side or left side.

10. The backpack method of claim 7 where electrical and mechanical apparatus comprises of an electric motor, a switch, a plurality of gears of a plurality of ratios and a plurality of sliding and rotating shafts.

11. The backpack method of claim 7 where the mechanical apparatus comprises a waterproofing rubber seal, storage compartment cover pressed over the storage compartment using rotating plate and pull cable.

12. The backpack method of claim 7 where the two sideways and one rotate movement occur simultaneously.

13. A backpack apparatus, comprising:

a back portion comprising of a regular holding space, a base wearable on a user's back using two shoulder straps for carrying on a user's back and;

a plurality of front access storage compartments mounted on a plurality of sliding chassis attached to the base and;

an apparatus to mount a plurality of sliding chassis on a plurality of a second set of sliding chassis and;

an apparatus to move a plurality of storage compartments sideways outward, rotate on a pivot and sideways forward for frontal access.

14. The backpack apparatus of claim 13 comprising a single first sliding chassis, a single second sliding chassis and a single storage compartment.

15. The backpack apparatus of claim 13 where frontal access is at least from the right side or left side.

16. The backpack apparatus of claim 13 where electrical and mechanical apparatus comprises of an electric motor, a

switch, a plurality of gears of a plurality of ratios and a plurality of sliding and rotating shafts.

17. The backpack apparatus of claim **13** where the mechanical apparatus comprises a waterproofing rubber seal, storage compartment cover pressed over the storage compartment using rotating plate and pull cable.

18. The backpack apparatus of claim **13** where the two sideways and one rotate movement occur simultaneously.

19. The backpack apparatus of claim **17** where the electric motor is replaced by a manual movement or movement through use of springs.

* * * * *