(54) Title: DUAL FUNCTION LUGGAGE HANDLE ASSEMBLY

(57) Abstract: A dual function luggage handle assembly is provided. The dual function luggage handle assembly comprises at least a cylinder mounted to a luggage support structure. A rod disposed in each of the at least a cylinder is telescopically movable between a collapsed position and an extended position. A hand grip is connected to a first end of each rod. A piston is connected to a second opposite end of each rod. The piston, in concert with the respective cylinder, forms a compression chamber. An intake mechanism is provided for enabling airflow into the compression chamber when the rod is moved from the collapsed position to the extended position. An outlet mechanism is provided for enabling airflow from the compression chamber when the rod is moved from the extended position to the collapsed position. A connect port is in fluid communication with the outlet mechanism. The connect port is adapted for being connected to an inflatable device. In a first function the luggage handle assembly enables handling of the luggage with the hand grip being movable between a storage position and a luggage handling position, and in a second function the handle assembly enables inflating of the inflatable device.
FIELD OF THE INVENTION

The present invention relates to a retractable luggage handle, and more particularly, to a dual function luggage handle assembly that enables handling of a piece of luggage in a first function and enables inflating of an inflatable device in a second function.

BACKGROUND OF THE INVENTION

Present-day luggage for travelers is provided in various types and sizes such as, for example, carry-ons, suitcases, uprights, and duffle bags. For ease of handling, most of these pieces of traveler luggage are provided with wheels or casters and retractable handles, thus enabling the traveler to 'wheel' the luggage by pulling or pushing the same in an airport, a train station, or a bus station.

Unfortunately, travelers frequently encounter long delays in their travel, for example, between connecting flights/trains/buses, due to high volume during holiday season, adverse weather, or other reasons. In such situations travelers frequently sleep on benches or even on the floor of airports or other areas of travel for lack of proper resting places. Therefore, some travelers carry an air mattress and an air pump in their luggage in order to rest comfortably when encountering long delays. However, while a deflated and properly folded air mattress is easily placed in the luggage, an air pump typically uses a substantial amount of space in the luggage, which is at a premium, especially when traveling by plane.

It is desirable to provide a dual function luggage handle assembly that enables handling of a piece of luggage in a first function and enables inflating of an inflatable device in a second function.

It is also desirable to provide a dual function luggage handle assembly that provides an air pump that is 'built-in' in a piece of luggage.
It is also desirable to provide a dual function luggage handle assembly that provides an air pump that is 'built-in' in a piece of luggage such that the storage space and the outside dimensions of the piece of luggage are substantially unchanged.

SUMMARY OF THE INVENTION

Accordingly, one object of the present invention is to provide a dual function luggage handle assembly that enables handling of a piece of luggage in a first function and enables inflating of an inflatable device in a second function.

Another object of the present invention is to provide a dual function luggage handle assembly that provides an air pump that is 'built-in' in a piece of luggage.

Another object of the present invention is to provide a dual function luggage handle assembly that provides an air pump that is 'built-in' in a piece of luggage such that the storage space and the outside dimensions of the piece of luggage are substantially unchanged.

According to one aspect of the present invention, there is provided a dual function luggage handle assembly. The dual function luggage handle assembly comprises at least a cylinder mounted to a luggage support structure. A rod disposed in each of the at least a cylinder is telescopically movable between a collapsed position and an extended position. A hand grip is connected to a first end of each rod. A piston is connected to a second opposite end of each rod. The piston, in concert with the respective cylinder, forms a compression chamber. An intake mechanism is provided for enabling airflow into the compression chamber when the rod is moved from the collapsed position to the extended position. An outlet mechanism is provided for enabling airflow from the compression chamber when the rod is moved from the extended position to the collapsed position. A connect port is in fluid communication with the outlet mechanism. The connect port is adapted for being connected to an inflatable device. In a first function the luggage handle assembly enables handling of the luggage with the hand grip being...
movable between a storage position and a luggage handling position, and in a second function
the handle assembly enables inflating of the inflatable device.

According to the aspect of the present invention, there is provided a dual function luggage handle
assembly. The dual function luggage handle assembly comprises at least a cylinder mounted to a
luggage support structure. A rod disposed in each of the at least a cylinder is telescopically
movable between a collapsed position and an extended position. A hand grip is connected to a
first end of each rod. A piston is connected to a second opposite end of each rod. The piston in
concert with the respective cylinder forms a compression chamber. An intake check valve is
provided in each piston for enabling airflow into the compression chamber when the rod is
moved from the collapsed position to the extended position. An outlet mechanism is provided for
enabling airflow from the compression chamber when the rod is moved from the extended
position to the collapsed position. A connect port is in fluid communication with the outlet
mechanism. The connect port is adapted for being connected to an inflatable device. In a first
function the luggage handle assembly enables handling of the luggage with the hand grip being
movable between a storage position and a luggage handling position, and in a second function
the handle assembly enables inflating of the inflatable device.

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assembly. The dual function luggage handle assembly comprises at least a cylinder mounted to a
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movable between a collapsed position and an extended position. A hand grip is connected to a
first end of each rod. A piston is connected to a second opposite end of each rod. The piston, in
concert with the respective cylinder, forms a compression chamber. An intake mechanism is
provided in the form of a piston cup for each piston for enabling airflow into the compression
chamber when the rod is moved from the collapsed position to the extended position. An outlet
mechanism is provided for enabling airflow from the compression chamber when the rod is
moved from the extended position to the collapsed position. A connect port is in fluid
communication with the outlet mechanism. The connect port is adapted for being connected to an
inflatable device. In a first function the luggage handle assembly enables handling of the luggage
with the hand grip being movable between a storage position and a luggage handling position,
and in a second function the handle assembly enables inflating of the inflatable device.

According to the aspect of the present invention, there is provided a dual function luggage handle assembly. The dual function luggage handle assembly comprises two cylinders mounted to a luggage support structure. A rod disposed in each of the cylinders is telescopically movable between a collapsed position and an extended position. A hand grip is connected to a first end of each rod. A piston is connected to a second opposite end of each rod. The piston in concert with the respective cylinder forms a compression chamber. An intake mechanism is provided for enabling airflow into the compression chamber when the rod is moved from the collapsed position to the extended position. An outlet mechanism is provided for enabling airflow from the compression chamber when the rod is moved from the extended position to the collapsed position. A connect port is in fluid communication with the outlet mechanism. The connect port is adapted for being connected to an inflatable device. The outlet mechanism comprises a T-junction and a single outlet check valve interposed between the two cylinders and the connect port. In a first function the luggage handle assembly enables handling of the luggage with the hand grip being movable between a storage position and a luggage handling position, and in a second function the handle assembly enables inflating of the inflatable device.

According to the aspect of the present invention, there is provided a dual function luggage handle assembly. The dual function luggage handle assembly comprises two cylinders mounted to a luggage support structure. A rod disposed in each of the cylinders is telescopically movable between a collapsed position and an extended position. A hand grip is connected to a first end of each rod. A piston is connected to a second opposite end of each rod. The piston in concert with the respective cylinder forms a compression chamber. An intake mechanism is provided for enabling airflow into the compression chamber when the rod is moved from the collapsed position to the extended position. An outlet mechanism is provided for enabling airflow from the compression chamber when the rod is moved from the extended position to the collapsed position. A connect port is in fluid communication with the outlet mechanism. The connect port is adapted for being connected to an inflatable device. The outlet mechanism comprises a T-junction and a single outlet check valve interposed between the two cylinders and the connect port. The intake mechanism comprises a single intake check valve connected to the T-junction
and an intake port. In a first function the luggage handle assembly enables handling of the luggage with the hand grip being movable between a storage position and a luggage handling position, and in a second function the handle assembly enables inflating of the inflatable device.

The advantage of the present invention is that it provides a dual function luggage handle assembly that enables handling of a piece of luggage in a first function and enables inflating of an inflatable device in a second function.

A further advantage of the present invention is that it provides a dual function luggage handle assembly that provides an air pump that is ‘built-in’ in a piece of luggage.

A further advantage of the present invention is that it provides a dual function luggage handle assembly that provides an air pump that is ‘built-in’ in a piece of luggage such that the storage space and the outside dimensions of the piece of luggage are substantially unchanged.

BRIEF DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the present invention is described below with reference to the accompanying drawings, in which:

Figures 1a and 1b are simplified block diagrams illustrating in a back view and an opened font view, respectively, a carry-on having a dual function luggage handle assembly according to a preferred embodiment of the invention;

Figures 1c and 1d are simplified block diagrams illustrating in cross sectional views the dual function luggage handle assembly according to a preferred embodiment of the invention in a retracted position and an extended position, respectively;

Figures 1e and 1f are simplified block diagrams illustrating in cross sectional views the dual function luggage handle assembly according to a preferred embodiment of the invention with the handle assembly being moved from the retracted position to the
extended position and vice versa, respectively;

Figures 2a and 2b are simplified block diagrams illustrating in cross sectional views a piston cup of the dual function luggage handle assembly according to another preferred embodiment of the invention with the handle assembly being moved from the retracted position to the extended position and vice versa, respectively;

Figures 3a and 3b are simplified block diagrams illustrating in cross sectional views an intake and outlet mechanism of the dual function luggage handle assembly according to another preferred embodiment of the invention with the handle assembly being moved from the retracted position to the extended position and vice versa, respectively; and,

Figure 4 is a simplified block diagram illustrating in a front view a traveler luggage cart having a dual function luggage handle assembly according to a preferred embodiment of the invention.

**DESCRIPTION OF THE PREFERRED EMBODIMENT**

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which the invention belongs.

Although any methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, the preferred methods and materials are now described.

While the description of the preferred embodiments hereinbelow is with reference to a carry-on piece of luggage, it will become evident to those skilled in the art that the embodiments of the invention are not limited thereto, but that the dual function luggage handle assembly is also implementable in a similar manner with various other types of travelers' luggage having a retractable handle such as, for example, suitcases, uprights, and duffle bags.

Referring to Figures 1a to If, a dual function luggage handle assembly 100 according to a
preferred embodiment of the invention is provided. The dual function luggage handle assembly 100 is, for example, implemented in a carry-on 10, as illustrated in Figures 1a and 1b. The carry-on 10 comprises body 18, cover 20, and bottom 14 forming enclosure 16. Mounted to the bottom 14 are wheels 12, for example, partially disposed in wheel housings 22. The carry-on 10 is made in a conventional manner using a flexible textile material such as, for example, a polyester material and a substantially rigid material for the bottom 14 and a portion of the top 15 such as, for example, a polycarbonate or PVC material. Alternatively, the complete carry-on 10 is made of a substantially rigid material such as, for example, polycarbonate or PVC material.

Cylinders 112 are mounted to the bottom 14 and top 15, forming the luggage support structure of the carry-on 10, in a conventional manner using, for example, screw fasteners. Rods 102 are disposed in the cylinders 112 with the top end thereof being connected to hand grip 104. The hand grip 14 in concert with the telescoping rods 102 is movable between a collapsed/retracted position I and an extended position II. The movement of the rods 102 is guided via respective guiding elements 124 accommodating the rods 102 therein. The guiding elements 124 are connected to respective caps 122 which are fastened to the respective cylinders 112 using, for example, a conventional screw fastening mechanism. The guiding elements 124 together with the respective caps 122 are, for example, made of aluminum sheet material using conventional sheet material forming technology.

Preferably, a conventional push-button locking mechanism is disposed in the rods 102 and the hand grip 104 with spring loaded locking elements 126 interacting with respective apertures disposed in guiding elements 124 for locking the dual function luggage handle assembly 100 in the retracted position, illustrated in Figure 1c, and the extended position, illustrated in Figure 1d. The locking elements 126 are retracted/disengaged by pushing button 106 disposed in hand grip 104. Optionally, more locking elements are disposed along the rods 102 enabling locking of the dual function luggage handle assembly 100 at different positions between the collapsed/retracted position I and an extended position II. Further optionally, the rods 102 are provided as telescopically extendable/retractable rods for use, for example with small pieces of luggage.

Mounted to a bottom end of each rod 102 is piston 114 with a bottom surface 115 thereof
forming compression chamber 130 in concert with the respective cylinder 112. The piston 114 is made of, for example, aluminum or a suitable plastic material such as PVC in a conventional manner. A substantially airtight seal between the piston 114 and the cylinder 112 is provided in a conventional manner using, for example, a conventional seal ring. The rods 102 and the cylinders 112 are made of, for example, aluminum or a suitable plastic material such as PVC in a conventional manner. The pistons 114 are mounted to the rods 102 in a conventional manner using, for example, a screw thread disposed on the bottom end of the rod 102 interacting with a respective screw threaded bore disposed in the piston 114.

During movement of the rods 102 with the hand grip 104 from the collapsed position I, illustrated in Figure 1c, to the extended position II, illustrated in Figure 1d, airflow into the compression chamber 130 is enabled through an intake mechanism such as intake check valves 118 - for example, off-the-shelf leaf valves - disposed in each of the pistons 114, as illustrated in Figure 1e. Alternatively, a bore disposed in the piston 114 is covered by a pivotally movable or flexible flap mounted to the bottom surface 115 of the piston. During movement of the rods 102 with the hand grip 104 from the extended position II, illustrated in Figure 1d, to the collapsed position I, illustrated in Figure 1c, compressed airflow from the compression chamber 130 to connect port 110 is provided via an outlet mechanism comprising T-junction 116 connected to both cylinders 112 and outlet check valve 120 - for example, an off-the-shelf leaf valve - disposed therebetween, as illustrated in Figure 1f. Reciprocal movement of the hand grip 104 provides the pumping action for inflating an inflatable device. Apertures 128 are disposed in the caps 122, as illustrated in the detail AA in Figure 1c, to enable: airflow into the space 132 between the cap 122 and the piston 114 during movement from position II to position I; and, airflow out from the space between the cap 122 and the piston 114 during movement from position I to position II.

The dual function luggage handle assembly 100 enables: - in a first function - handling of the luggage with the hand grip 104 being movable between the retracted position I and the extended position II; and - in a second function - inflating of an inflatable device connected to the connect port 110 by reciprocally moving the hand grip 104 - with the push button 106 pushed down for retracting the locking elements 126 - between the retracted position I and the extended position
Incorporation of the air pump mechanism into the retractable handle provides an air pump that is 'built-in' in a piece of luggage such that the storage space and the outside dimensions of the piece of luggage are substantially unchanged.

Preferably, the connect port 110 is disposed in a wall of the carry-on 10 for providing the airflow from the compression chamber therethrough to the outside. Further preferably, the connect port 110 is a quick connect port flush with the outside wall of the carry-on 10, has a removable cap for protecting the opening and is adapted for being directly connected to a respective quick connect of an inflatable device such as, for example, an air mattress.

Optionally, the air mattress is provided with a built-in check valve for facilitating removal from the connect port 110 without air loss and a quick release plug having a large opening to enable quick deflation of the mattress.

Alternatively, the connect port 110 is adapted for being connected to a standard connector used in off-the-shelf air mattresses. Further alternatively, a hose is provided for being interposed between the connect port 110 and the connector of the air mattress. Further alternatively, a hose is interposed between the outlet valve 120 and the connect port 110 with the hose and the connect port being disposed inside the carry-on 10, for example, in a designated compartment that is accessible from the outside.

Of course, the connect port 110 may be adapted for being connected to other inflatable devices such as, for example, basket balls, volley balls, swim rings, small boats, etc.

It is noted that the dual function luggage handle assembly 100 may also be implemented having only a single rod, a single cylinder and a single piston.

In an alternative embodiment of the dual function luggage handle assembly 100, illustrated in Figures 2a and 2b, the intake valves 118 are omitted by providing the pistons 114 with piston
cups 114A having peripheral sealing edges 114B. During movement from position I to position II as indicated by the block arrow in Figure 2a - intake airflow is enabled between the peripheral sealing edge 114B and the cylinder 112 - as indicated by the dashed block arrows in Figure 2a. During movement from position II to position I (compression) - as indicated by the block arrow in Figure 2b - the compressed air in the compression chamber acting on the piston cup 114A pushes the peripheral sealing edge 114B against the cylinder 112 - indicated by the arrows in Figure 2b - providing an airtight seal therebetween. Piston cups are commonly used and available off-the-shelf made of, for example, nitrile rubber, Ethylene Propylene Rubber (EPR), fluorelastomer, and silicone.

In another alternative embodiment of the dual function luggage handle assembly 100, illustrated in Figures 3a and 3b, the intake valves 118 disposed in the pistons 114 are replaced by a single intake valve 118 connected to the T-junction 116 of the outlet mechanism and connected to inlet opening 111 disposed, for example, in the wall of the carry-on 10. During movement from position I to position II, intake airflow is enabled through the inlet opening 111 and the inlet valve 118 - as indicated by the dashed block arrows in Figure 3a. During movement from position II to position I (compression) the compressed air flows through the T-junction 116 and the outlet valve 120 to the connect port 110 - indicated by the dashed block arrows in Figure 3b.

Referring to Figure 4, the dual function luggage handle assembly 100 is implemented in a traveler luggage cart 30, typically comprising a rear support frame structure 34 having wheels 32 mounted thereto. Bottom support frame structure 36 is pivotally movable mounted to the rear support frame structure 34 such that bottom support frame structure 36 extends substantially perpendicular from the rear support frame structure 34 in a first position and is oriented substantially parallel to the rear support frame structure 34 in a second position. The dual function luggage handle assembly 100 comprises the same components as described hereinabove with the cylinders 112 being mounted to the rear support frame structure 34 in a conventional manner.

The present invention has been described herein with regard to preferred embodiments. However, it will be obvious to persons skilled in the art that a number of variations and modifications can
be made without departing from the scope of the invention as described herein.
THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A dual function luggage handle assembly comprising:
   at least a cylinder mounted to a luggage support structure;
   a rod disposed in each of the at least a cylinder, the rod being telescopically movable between a collapsed position and an extended position;
   a hand grip connected to a first end of the rod;
   a piston connected to a second opposite end of each rod, the piston in concert with the respective cylinder forming a compression chamber;
   an intake mechanism for enabling airflow into the compression chamber when the rod is moved from the collapsed position to the extended position;
   an outlet mechanism for enabling airflow from the compression chamber when the rod is moved from the extended position to the collapsed position; and,
   a connect port in fluid communication with the outlet mechanism, the connect port being adapted for being connected to an inflatable device;
   wherein - in a first function - the luggage handle assembly enables handling of the luggage with the hand grip being movable between a storage position and a luggage handling position, and
   wherein - in a second function - the handle assembly enables inflating of the inflatable device.

2. The dual function luggage handle assembly according to claim 1 comprising a guiding element mounted to a first end of each of the at least a cylinder for guiding the movement of the respective rod.

3. The dual function luggage handle assembly according to claim 2 wherein the guiding element comprises an aperture for enabling airflow therethrough.

4. The dual function luggage handle assembly according to claim 2 wherein the guiding element is adapted for abutting the respective rod when in the extended position.

5. The dual function luggage handle assembly according to claim 1 comprising an adjustable
abutting mechanism adapted for - in the first function - adjustably abutting the respective rod at a
predetermined position between the collapsed position and the extended position, and - in the
second function - enabling reciprocal movement of the respective rod between the collapsed
position and the extended position.

6. The dual function luggage handle assembly according to claim 1 wherein the intake
mechanism comprises a check valve in fluid communication with the compression chamber.

7. The dual function luggage handle assembly according to claim 6 wherein the check valve is
disposed in the piston.

8. The dual function luggage handle assembly according to claim 1 wherein the intake
mechanism comprises a cup shaped extension of the piston.

9. The dual function luggage handle assembly according to claim 1 wherein the luggage handle
assembly comprises two cylinders with the respective rods mounted to one hand grip.

10. The dual function luggage handle assembly according to claim 9 wherein the outlet
mechanism comprises a T-junction connected to both compression chambers and one outlet
check valve.

11. The dual function luggage handle assembly according to claim 10 wherein the intake
mechanism comprises an intake check valve connected to the outlet mechanism.

12. The dual function luggage handle assembly according to claim 1 wherein the luggage support
structure is an integral part of a piece of luggage.

13. The dual function luggage handle assembly according to claim 12 wherein the connect port is
disposed in a wall of the piece of luggage for providing the airflow from the compression
chamber therethrough.
14. The dual function luggage handle assembly according to claim 1 wherein the luggage support structure forms part of a luggage cart.
Figure 3a

Figure 3b
INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2016/000184

A. CLASSIFICATION OF SUBJECT MATTER
IPC: A45C 13/22 (2006.01) , A45C 5/03 (2006.01) , A45C 5/14 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: A45C 13/22 (2006.01) , A45C 5/03 (2006.01) , A45C 5/14 (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)
Canadian Patents Database, Questel-Orbit, GoogleScholar
Search terms used: luggage/suitcase, handle/grip, telescoping, piston, inflate/inflating.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>US20130126286 A1 (CHEFTEBAR, A.) 23 May 2013 (23-05-2013) <em>Abstract; page 8, paragraph [0090]</em></td>
<td>1-14</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search
29 September 2016 (29-09-2016)

Date of mailing of the international search report
29 September 2016 (29-09-2016)

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Facsimile No.: 819-953-2476

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