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(54) **LUGGAGE BAG WITH HANDLE-ACTIVATED WHEEL DEPLOYMENT SYSTEM**

(76) Inventor: **Anthony Sanford-Schwentke**, Hannover (DE)

Correspondence Address:
INTELLECTUAL PROPERTY LAW OFFICE
1901 S. BASCOM AVENUE, SUITE 660
CAMPBELL, CA 95008 (US)

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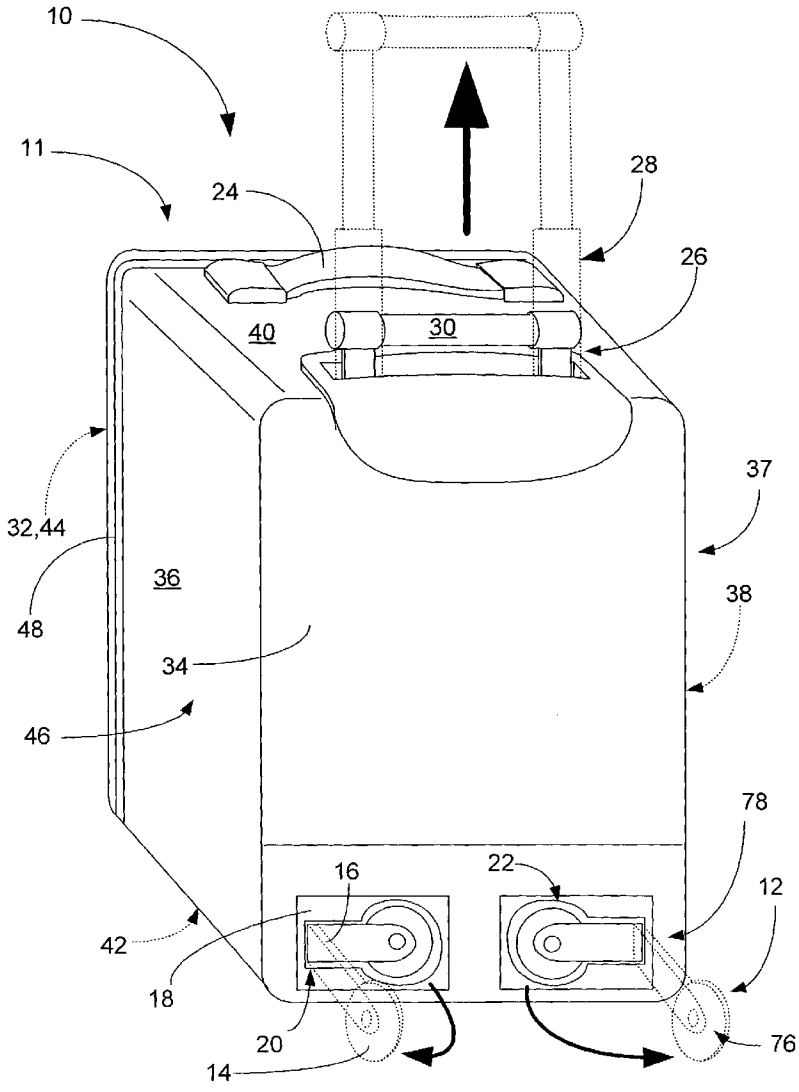
(57) **ABSTRACT**

A luggage bag (**10**) having a handle-activated wheel deployment system (**11**), which includes an extendable handle assembly (**26**) having a number of extendable members (**25**), and a cross piece (**30**) joining the extendable members (**25**). Also included is a number of extendable wheel assemblies (**12**) having extendable wheels (**14**) which are movable from a retracted position (**78**) to an extended position (**76**), and axel brackets (**16**) which are rotatable about a pivot (**20**). The axel bracket (**16**) also has at least one extension tab (**74**). An activation assembly (**50**) includes a linkage (**49**) which connects the extendable handle assembly (**26**) and at least one extendable wheel assembly (**12**), so that extension of the handle assembly (**26**) causes extension of the extendable wheels (**14**). The activation assembly (**50**) acts to move the extension tab (**74**) to pivot the wheels (**14**) to extend or retract.



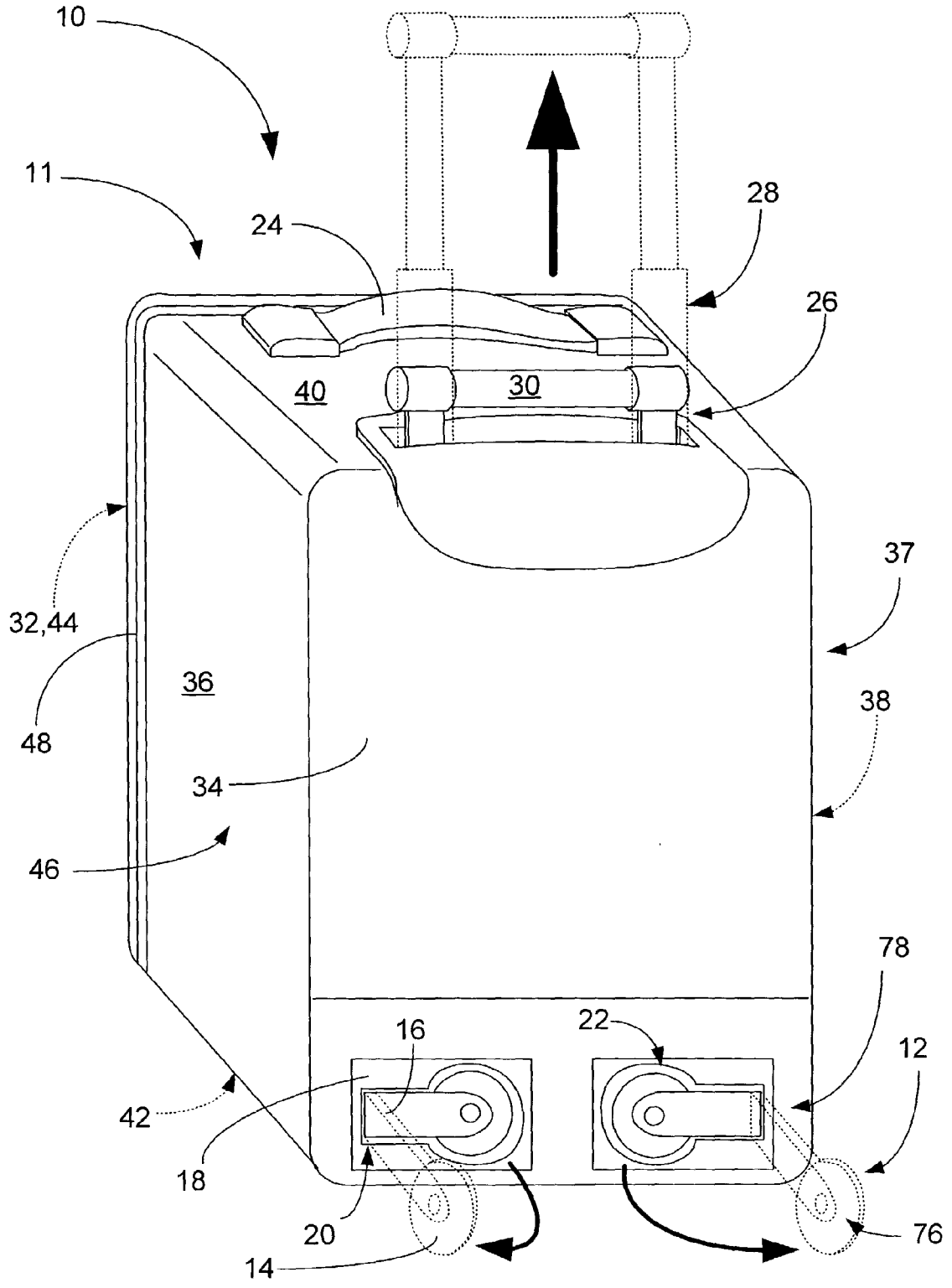


FIGURE 1

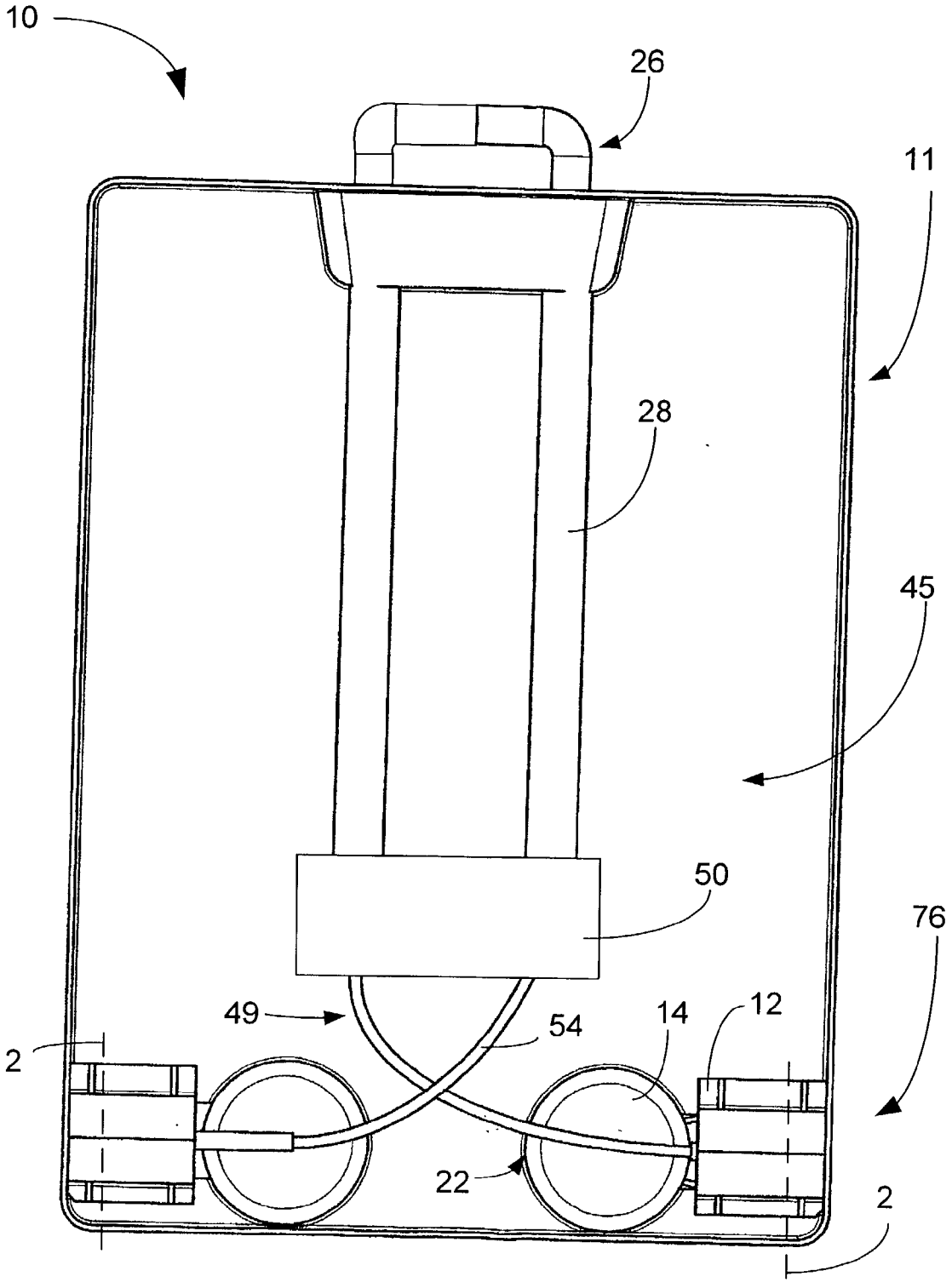
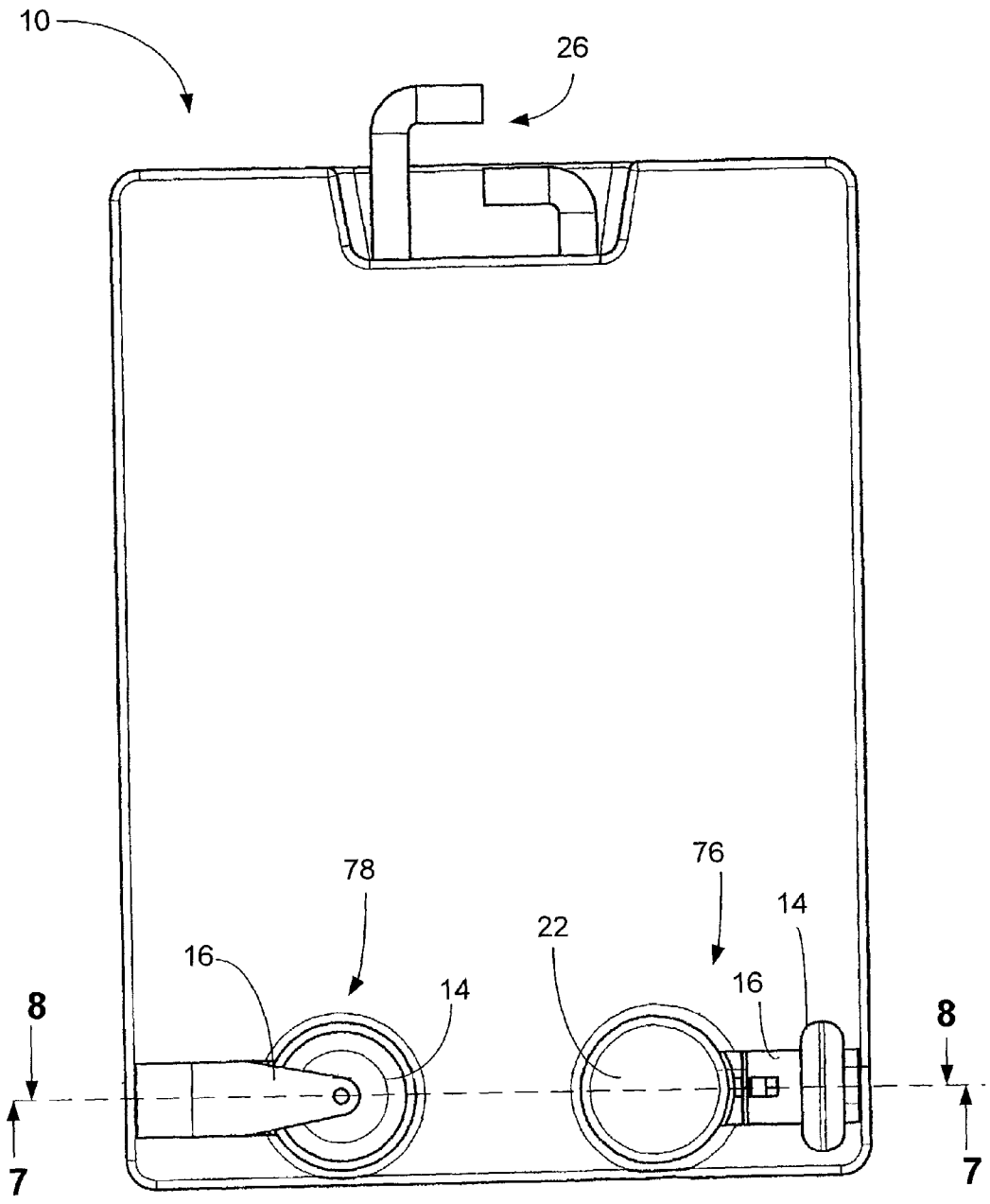


FIGURE 2



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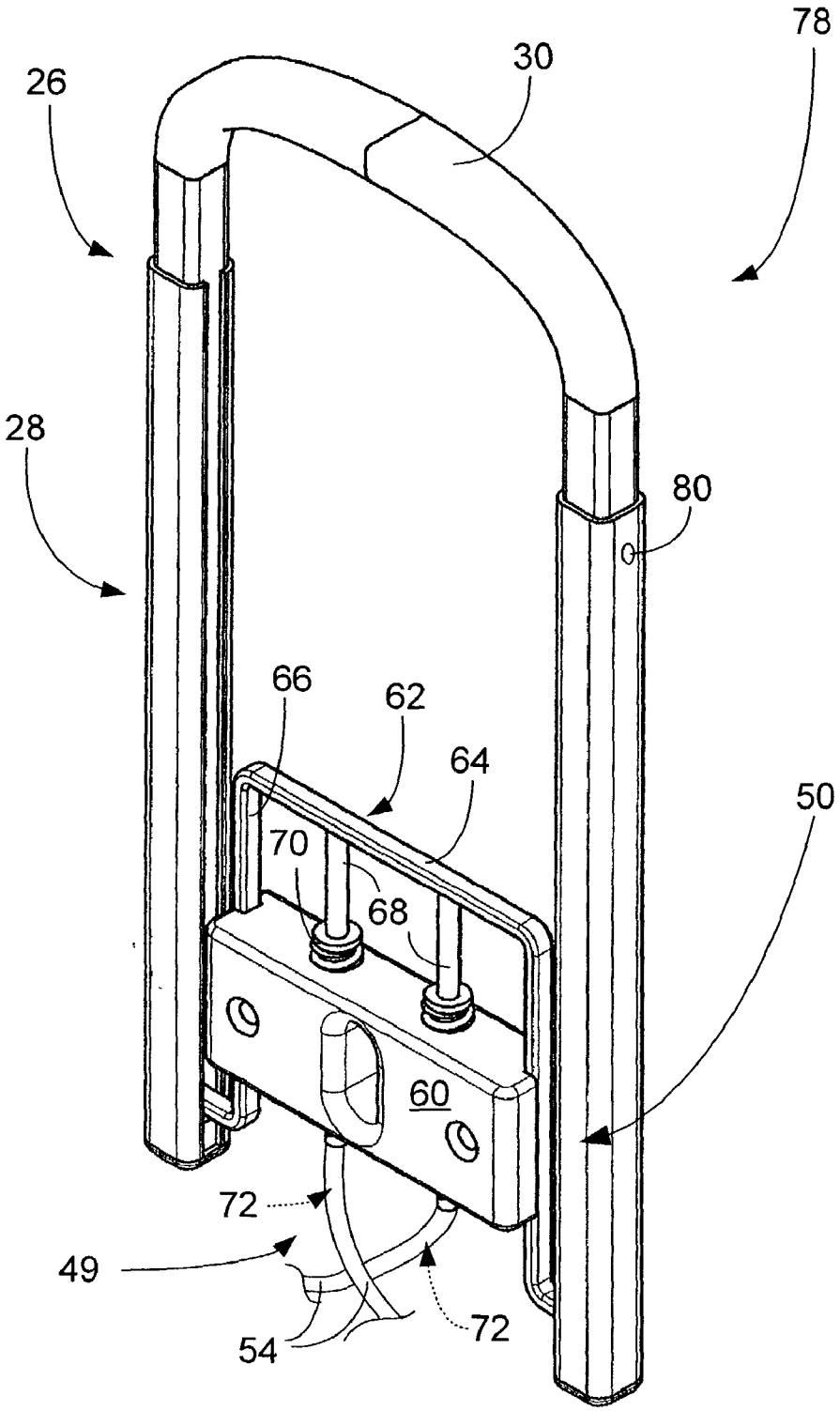

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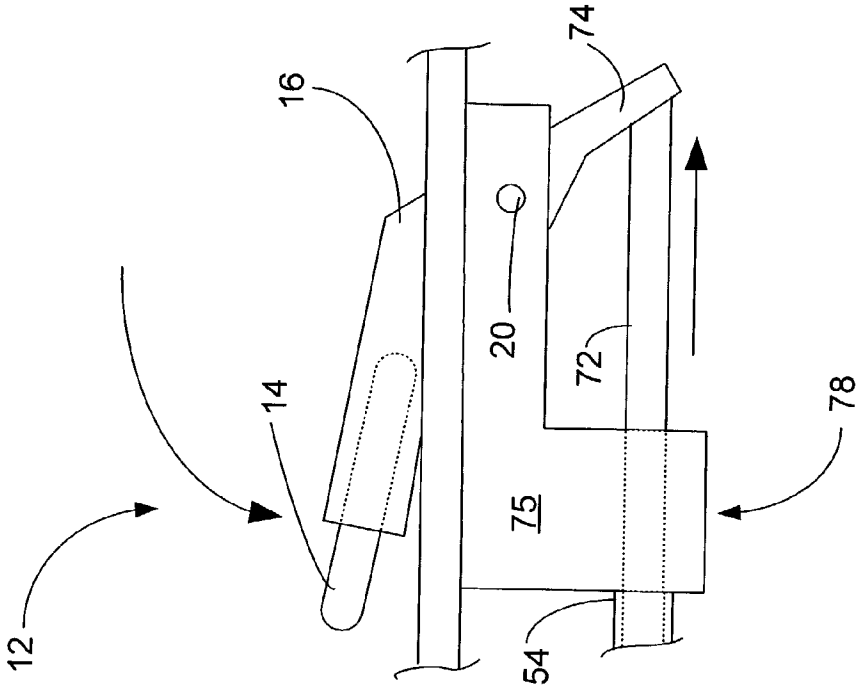

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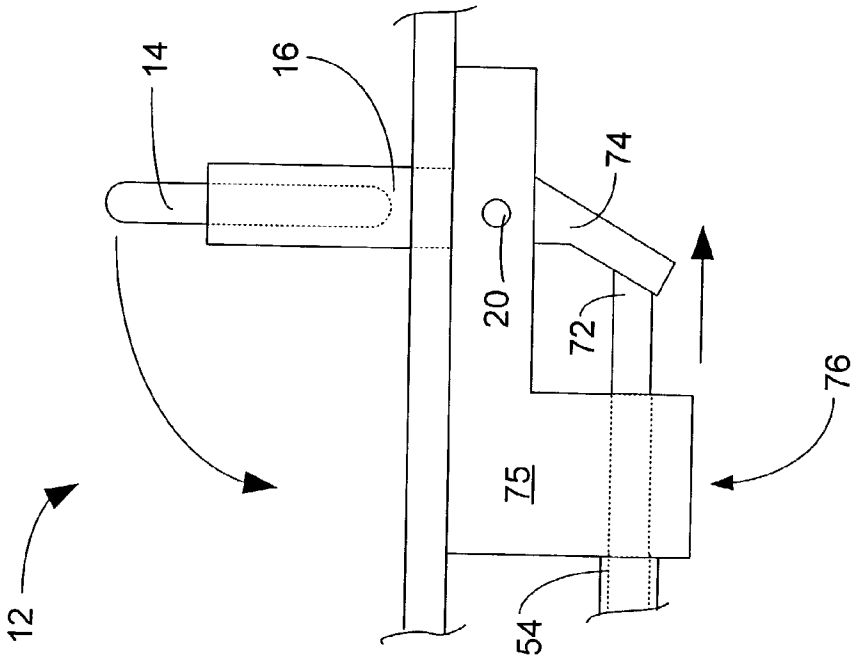


FIGURE 5

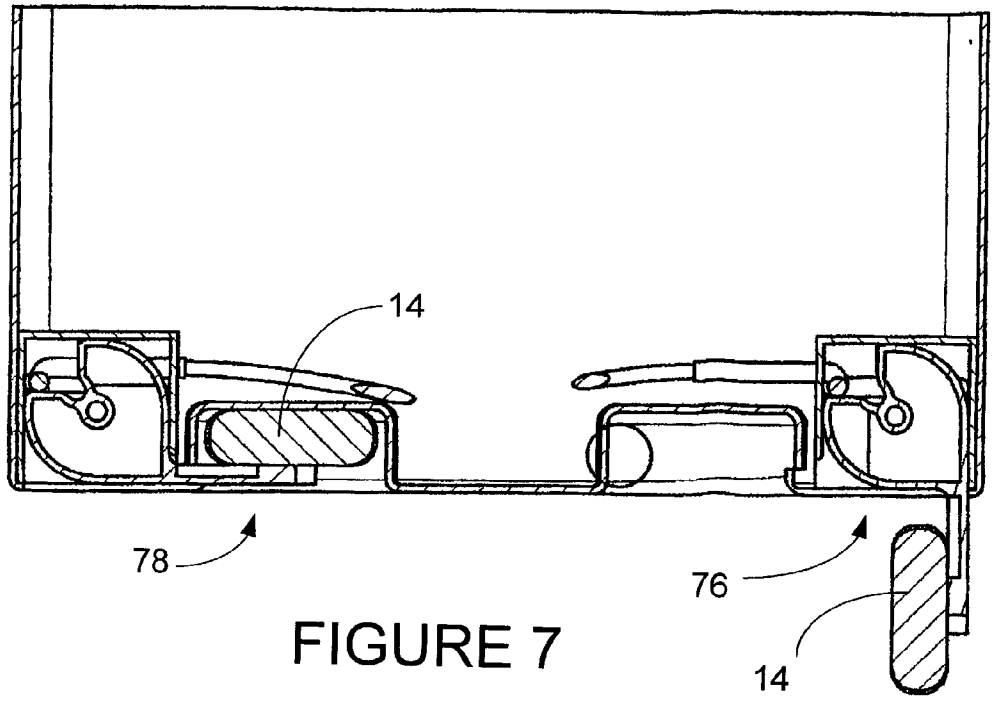


FIGURE 7

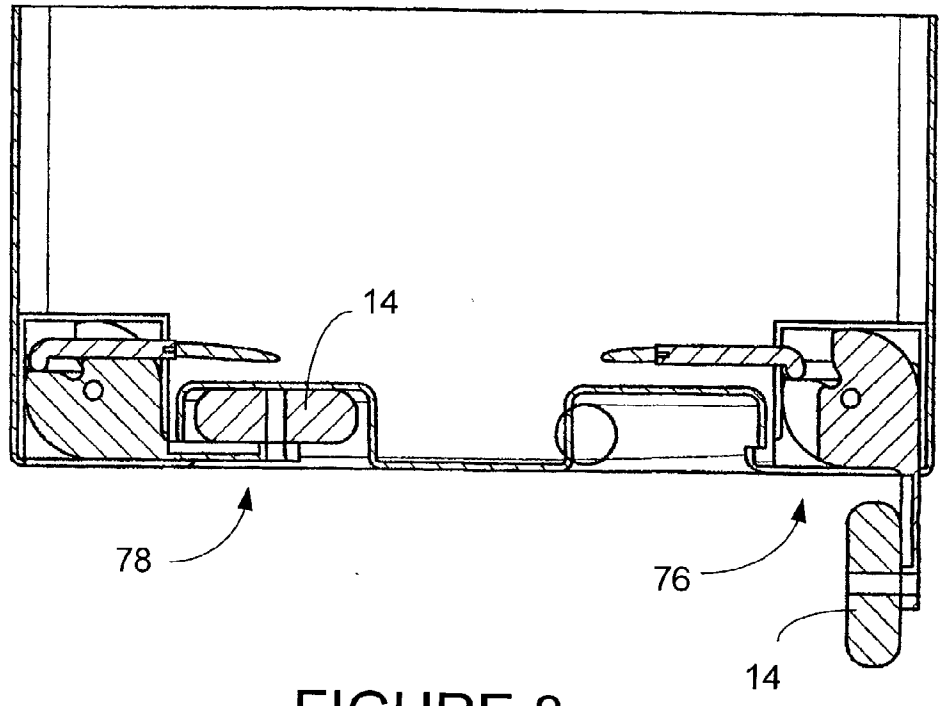


FIGURE 8

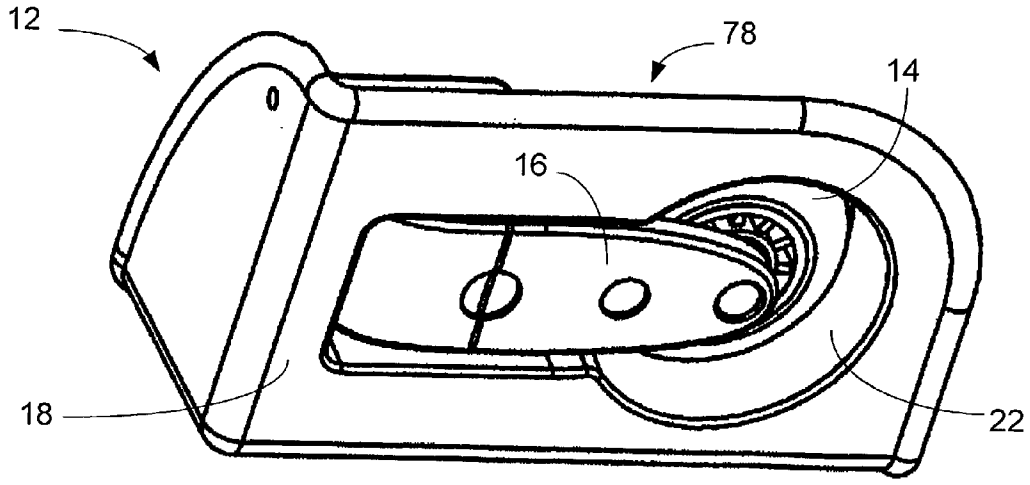
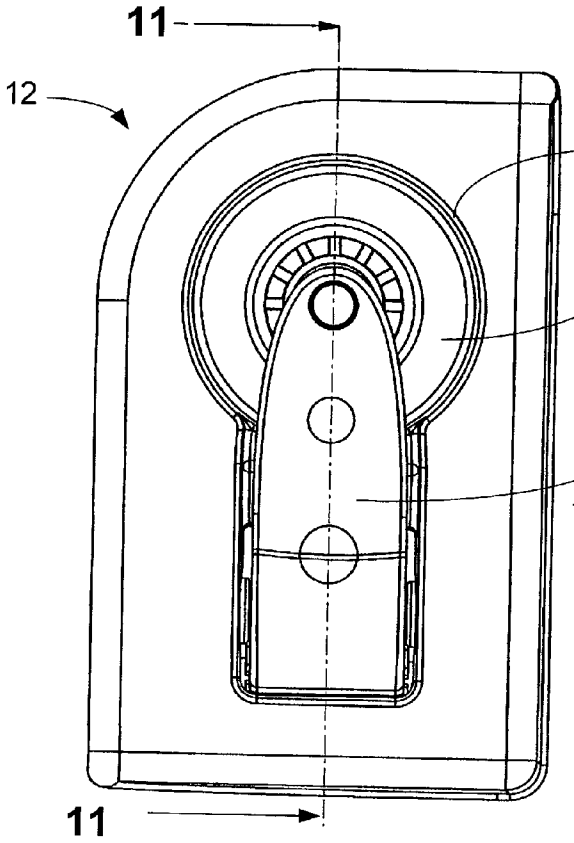


FIGURE 9



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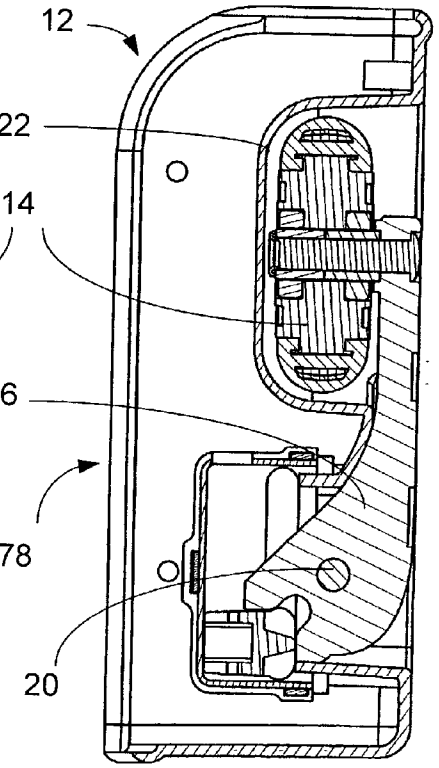

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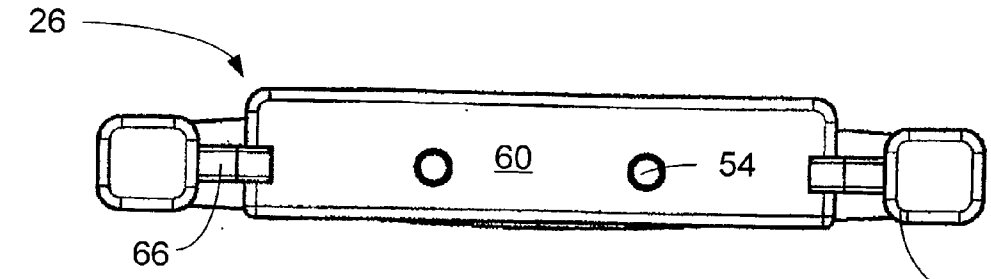

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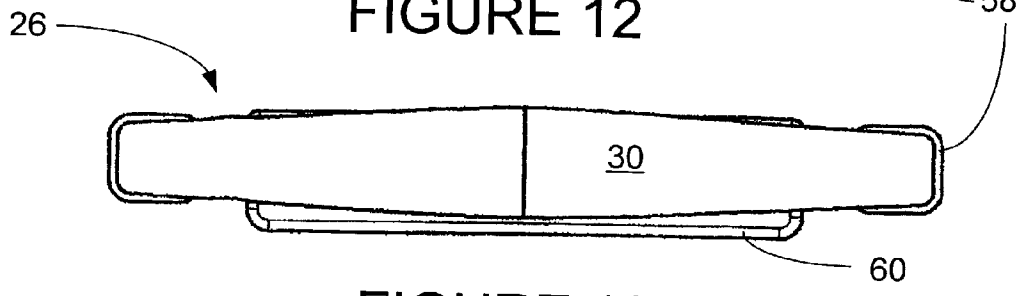

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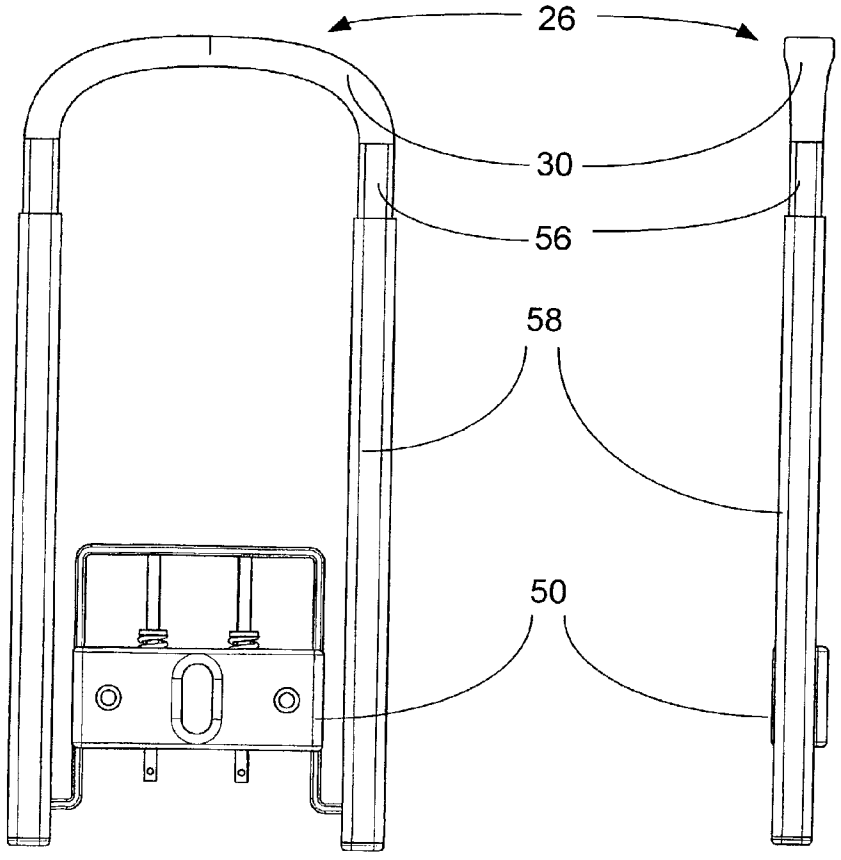

FIGURE 14

FIGURE 15

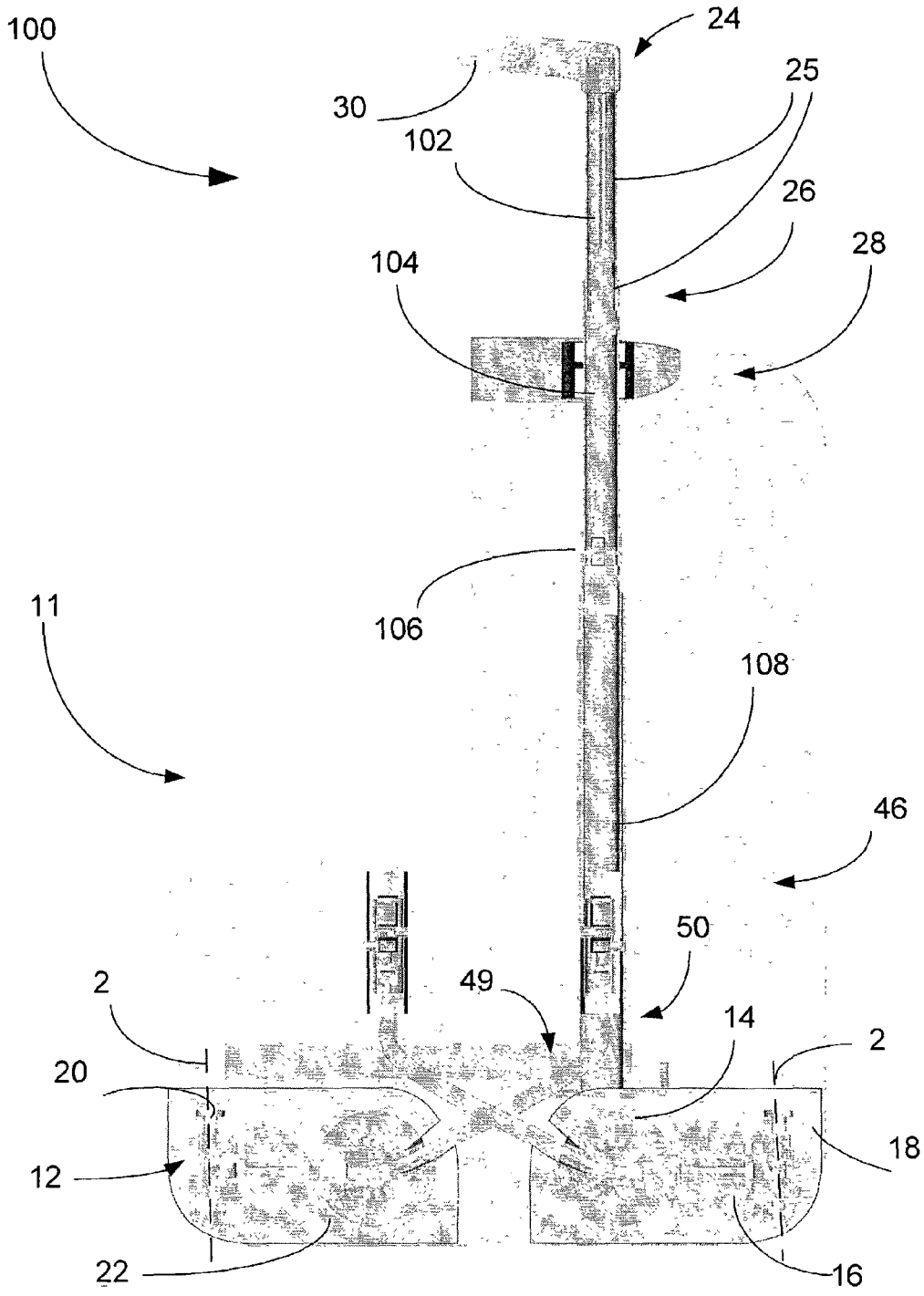

FIGURE 16

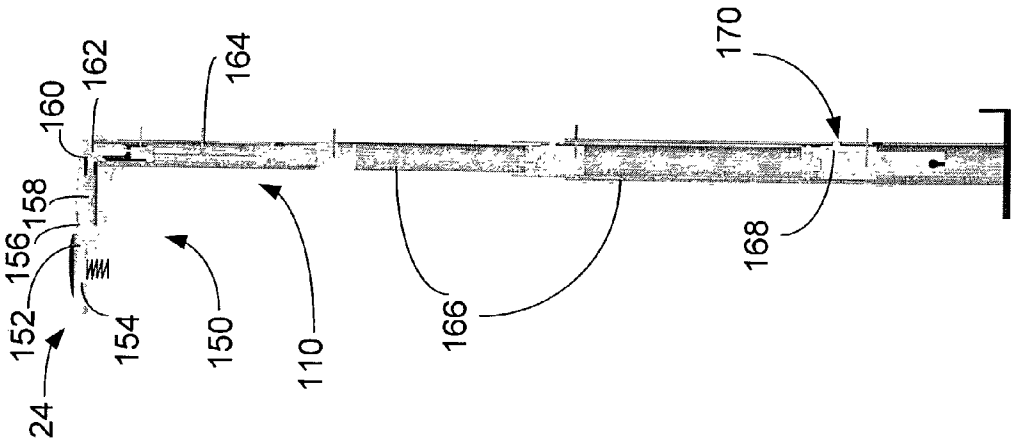

FIGURE 18

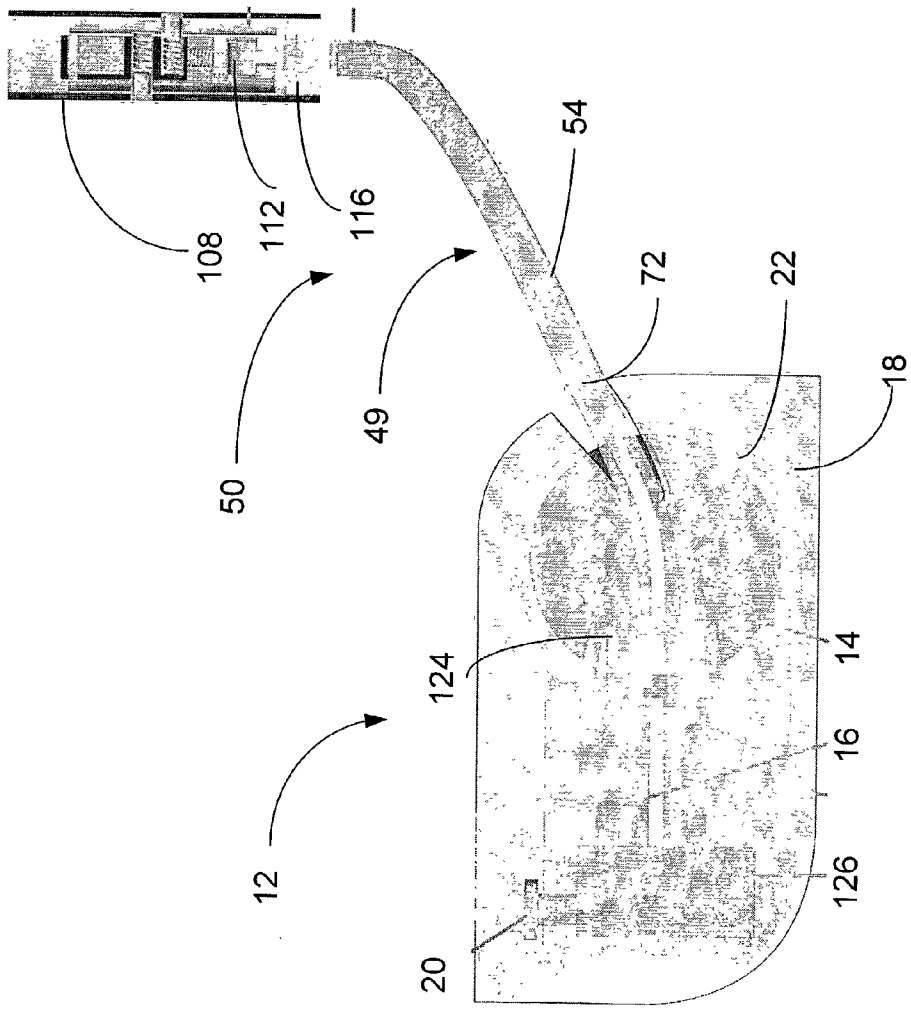

FIGURE 17

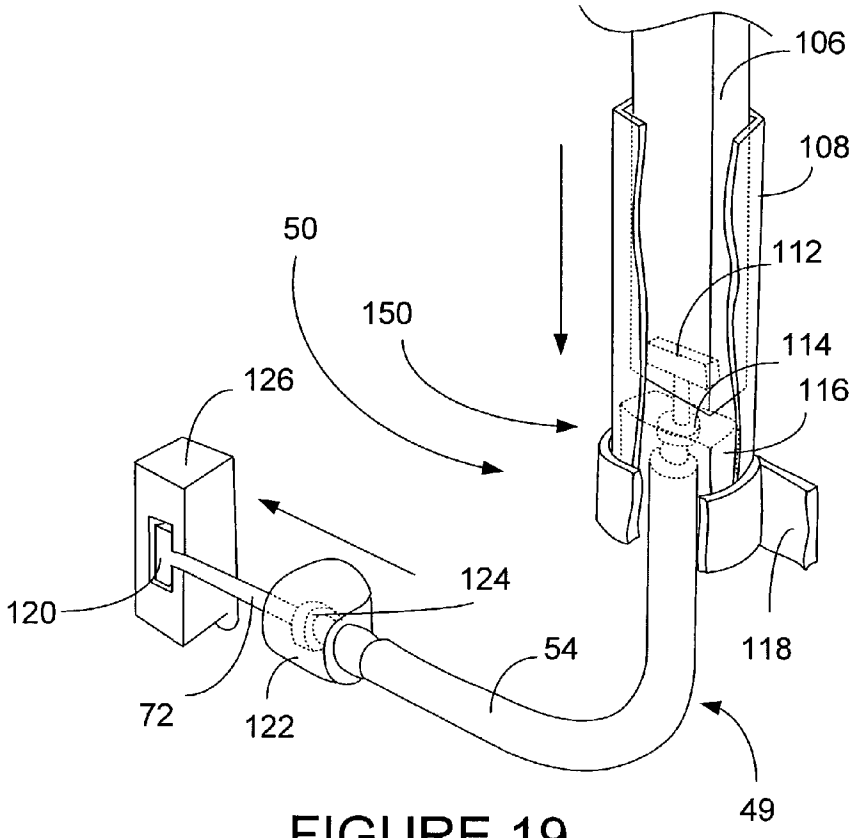

FIGURE 19

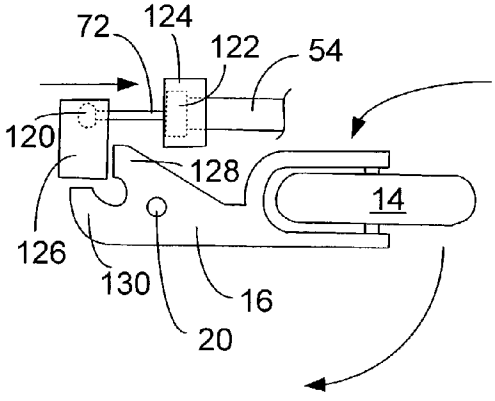

FIGURE 20A

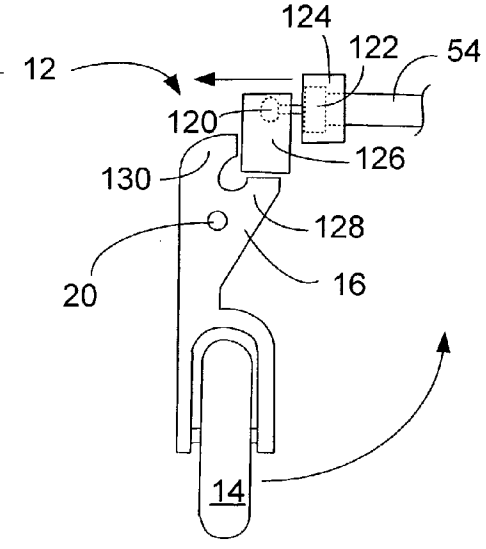

FIGURE 20B

LUGGAGE BAG WITH HANDLE-ACTIVATED WHEEL DEPLOYMENT SYSTEM

[0001] The following non-provisional application claims priority from provisional patent application No. 60/301,690, filed Jun. 27, 2001, which has the same inventor as the present application.

TECHNICAL FIELD

[0002] The present invention relates generally to carriers for luggage, and carts for transporting baggage.

BACKGROUND ART

[0003] Luggage is the traditional way that travelers have used to carry clothing and personal items while on vacations and business trips. The standard suitcase typically has one or more handles which are used to lift and carry the suitcase from place to place. In the past few years, an up-right style suitcase can been developed which has a built-in cart for wheeling the suitcase around. This style typically has permanently mounted exterior wheels and an extendable handle which telescopes outward to allow the user to grasp and pull the handle without bending over. The suitcase generally stands on one end so that it is taller in a vertical direction than in a horizontal one, thus this style will be referred to in this application as an "up-right suitcase".

[0004] The up-right suitcase has proven to be very popular due to its ease of use and convenience. However, it has some disadvantages. The wheels are typically permanently mounted to the lower rear corners of the suitcase. In order to allow the suitcase to stand upright when parked, there are optionally two additional feet included on the bottom surface, so that the suitcase rests on four contact points two wheels and two feet. This adds additional height to the overall dimension of the suitcase. Of course it is a generally accepted principle that luggage should be as compact as possible to make its transport as easy as possible, and its storage volume should be as small as possible. Thus the additional height produced by the permanently extended wheels is an undesirable feature. Even for those up-right suitcases which do not additional feet on the bottom, the permanently extended wheels still add to the overall height.

[0005] As any traveler knows, the handling of baggage can be rough at times, and extended wheels are a prime target for damage, being both one of the most protruding features of the luggage and one of the most vulnerable. Wheels which are permanently extended present an opportunity for them to snag on other external items, such as the handles of other suitcases in a baggage compartment. In addition, wheels are generally somewhat fragile, since the axial alignment of the wheels is important to good operation, and axial alignment can be disrupted by blows to the wheels or their components.

[0006] It is therefore desirable that wheels on luggage are not permanently extended to present a hazard to other items and themselves. However, it is not desirable that the wheels require a complex operation to disengage them or retract them from use. Certainly, a user would probably find detachable wheels to be impractical both because the wheels could then become lost or stolen and because they would most likely be less stable, perhaps become loose with extended usage. Thus extendable wheels would be highly desirable, as long as the retraction and extension mechanism would preferably not require great effort by the user. Travelers generally have a great number of details to deal with, and manipulating luggage wheels should not be an operation which requires much concentration.

[0007] There have been several prior luggage items which include extendable wheels. U.S. Pat. No. 3,891,230 to Mayer, U.S. Pat. No. 4,217,675 to Haft, U.S. Pat. No. 4,915,402 to Brinker and U.S. Pat. No. 5,956,805 to Huang all have extendable wheels which must be manually deployed as in Mayer and Haft, or extend and retract by pressing various buttons as in Brinker or depressing levers as in Huang. These have various disadvantages, as they require the user to manipulate the wheels, buttons or levers which are located at the bottom of the case, and may require stooping to reach them, or lift the luggage to a position where the bottom is reachable.

[0008] U.S. Pat. No. 5,758,752 to King discloses a suitcase with wheels that extend or retract automatically by spring action, apparently not directed by the motion of the handle.

[0009] U.S. Pat. No. 4,575,109 to Cowdery, U.S. Pat. No. 4,254,850 to Knowles and U.S. Pat. No. 6,360,400 to Chang disclose luggage cases which use handle-activated mechanisms to pivot wheels into extended or retracted position. These involve generally complicated mechanisms involving cams in order to move the wheels in response to movement by the handle. Considering the rough handling that luggage cases often receive, these complicated mechanisms may be vulnerable to damage or else they must be heavily fortified, which of course increases the weight of the case.

[0010] Thus there is a need for luggage which has extendable wheels, so that the wheels are protected from damage, and will not catch on other items in the environment. There is also a need for luggage in which the retraction mechanism operates smoothly and without the necessity for the user to perform complex manipulations to extract the wheels from housings.

DISCLOSURE OF INVENTION

[0011] Accordingly, it is an object of the present invention to provide a luggage bag with a built-in cart which has extendable wheels.

[0012] Another object of the invention is to provide a luggage bag in which wheels extend and retract smoothly and with minimal manipulation by the user.

[0013] And another object of the invention is to provide a luggage bag in which wheels extend or retract in response to action by the handle.

[0014] Briefly, one preferred embodiment of the present invention is a luggage bag including an enclosure for containing articles to be transported, the luggage bag having a handle-activated wheel deployment system. This system includes an extendable handle assembly having a number of extendable members, and a cross piece joining the extendable members. Also included in the system is an extendable wheel assembly which has extendable wheels which are movable from a retracted position to an extended position. These extendable wheel assemblies each include an axel bracket which is rotatable about a pivot. The axel bracket

also has at least one extension tab. An activation assembly includes a linkage which connects the extendable handle assembly and one or more of the extendable wheel assemblies, so that extension of the extendable handle assembly causes extension of the extendable wheels. The activation assembly acts to move the extension tab to pivot the wheels to extend or retract.

[0015] Also disclosed is an extendable wheel assembly.

[0016] An advantage of the present invention is that the wheels retract to wells which are recessed so that little or none of the wheels protrude to catch on external objects.

[0017] Another advantage of the present invention is that the wheels retract so that they are protected from damage.

[0018] And another advantage of the present invention is that the wheels operate easily by manipulation of the handle.

[0019] A further advantage of the present invention is that the luggage bag presents a streamlined and attractive profile when the wheels are retracted.

[0020] A yet further advantage is that the wheels move quickly and smoothly from a retracted position to an extended position.

[0021] These and other objects and advantages of the present invention will become clear to those skilled in the art in view of the description of the best presently known mode of carrying out the invention and the industrial applicability of the preferred embodiment as described herein and as illustrated in the several figures of the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] The purposes and advantages of the present invention will be apparent from the following detailed description in conjunction with the appended drawings in which:

[0023] **FIG. 1** shows a front isometric view of the luggage bag of the present invention;

[0024] **FIG. 2** illustrates an interior plan view of the luggage bag of the present invention, with the wheels in retracted position;

[0025] **FIG. 3** shows a rear plan view of a theoretical split-handle luggage bag, which has one wheel in retracted position and one wheel in extended position;

[0026] **FIG. 4** shows an isometric view of the extendable handle assembly of the present invention in a retracted position;

[0027] **FIG. 5** illustrates a simplified top plan view of the wheel pivot assembly in extended position;

[0028] **FIG. 6** illustrates a simplified top plan view of the wheel pivot assembly in movement between an extended position and a retracted position;

[0029] **FIG. 7** shows a cross-sectional view as seen from line **7-7** in **FIG. 3**;

[0030] **FIG. 8** shows a cross-sectional view as seen from line **8-8** in **FIG. 3**;

[0031] **FIG. 9** illustrates an isometric view of the extendable wheel assembly of the present invention in retracted position;

[0032] **FIG. 10** shows a front plan view of the extendable wheel assembly of the present invention in retracted position;

[0033] **FIG. 11** shows a cross-sectional view of the extendable wheel assembly of the present invention in retracted position, as seen from line **11-11** in **FIG. 10**;

[0034] **FIG. 12** illustrates a bottom plan view of the extendable handle assembly of the present invention;

[0035] **FIG. 13** illustrates a top plan view of the extendable handle assembly of the present invention;

[0036] **FIG. 14** shows a front plan view of the extendable handle assembly of the present invention in retracted position;

[0037] **FIG. 15** illustrates a side plan view of the extendable handle assembly of the present invention in retracted position;

[0038] **FIG. 16** shows a partial plan cut-away view of a second embodiment of the present invention;

[0039] **FIG. 17** shows a detail view of a wheel pivot assembly and cable connection of the present invention;

[0040] **FIG. 18** illustrates a detail cut-away view of a portion of the telescoping handle assembly of the present invention;

[0041] **FIG. 19** shows a detail view of the lower portion of the telescoping handle assembly and cable connection of the present invention; and

[0042] **FIGS. 20A and B** show top views of a wheel pivot assembly in the process of being extended and retracted respectively.

BEST MODE FOR CARRYING OUT THE INVENTION

[0043] FIGS. **1-15** illustrates a first embodiment of a luggage bag which will be denoted by luggage bag **10** with a handle-activated wheel deployment system **11**. The luggage bag **10** includes an enclosure **37** for retaining and packing items to accompany the user during travels in the typical manner of suitcases. The enclosure **37** of the luggage bag **10** generally includes a front side **32**, back side **34**, first side **36**, second side **38**, top **40** and bottom **42**. The front side **32** includes the lid **44**, which attaches to the body **46** of the luggage bag **10** by a zipper **48** in a conventional manner. The luggage bag also preferably includes a conventional carrying handle **24**.

[0044] The handle-activated wheel deployment system **11** has generally an a number of extendable wheel assembly **12**, an extendable handle assembly **26**, a linkage **49** and activation assembly **50** which is used to link the motion of the handle **30** as it extends and retracts to the extension and retraction of the wheels **14**.

[0045] The extendable wheel assemblies **12** includes a pair of wheels **14**, which are rotatably attached to a pair of axel brackets **16**, which are in turn pivotally attached to a molding **18**, by pivots **20**. There are two wheel wells **22** into which the wheels **14** retract when not extended.

[0046] The extendable handle assembly **26** includes a number of extendable members **28** (shown in dashed lines in

FIG. 1) which slide within one another to extend the length of the assembly **26**. The extendable handle assembly **26** also includes a cross piece **30** which serves as an additional carrying handle and grip for extending the handle assembly **26**.

[**0047**] The activation assembly **50** is discussed in more detail below, but serves to move the wheels **14** from retracted position to extended position in response to movement of the extendable handle assembly **26** through a linkage **49** which couples the movement of the extendable handle assembly **26** to the extendable wheel assemblies **12**.

[**0048**] **FIG. 2** shows the interior **45** of the luggage bag **10** as seen with the lid removed, although the mechanisms here are preferably covered by a cloth layer, which has also been removed here. The extendable handle assembly **26** can be seen to include the handle portion **30**, the handle frame **28** and an activation assembly **50**, which is shown in more detail in **FIGS. 4 and 14**. Referring to FIGS. **2-4**, and **14-15**, the activation assembly **50** is connected to two extendable wheel assemblies **12** by tubes **54** which serve as part of the linkage **49**. The handle frame **28** is configured in two or more pieces, in this case, an inner member **56** and an outer member **58**. The inner member **56** is connected at its upper ends to the cross-piece **30**. The lower portions of the inner members **56** are free to slide within the outer member **58**. The activation assembly **50** includes a housing **60** and a central linkage member **62** having a cross piece **64**, two side pieces **66** and two prongs **68**. Two springs **70** surround the prongs **68** and are compressed between the cross piece **64** and the housing **60** thus serving to bias the cross piece **64** away from the housing **60**. The prongs **68** may be connected to cables **72**, or a portion of the cables **72** may serve as the prongs **68** themselves. The cables **72** then extend through the tubes **54** to the extendable wheel assemblies **12**.

[**0049**] The wheels **14** of the extendable wheel assemblies **12** each pivot about an axis of rotation **2** which is preferably vertical when the case is standing upright, or in other words, is parallel to the extendable members **25** of the extendable handle assembly **26**.

[**0050**] **FIGS. 5 and 6** show two stages in the retraction of the wheels **14** into the wheel wells **22**. Both views are top plan views which have been simplified for ease of viewing. The extendable wheel assemblies **12** each includes wheels **14** which are shown mounted in axel brackets **16**. These wheel brackets **16** have extension tabs **74**, and rotate about pivots **20**. Referring now also to **FIGS. 1 and 4**, Cables **72** are attached to the extension tabs **74** of the axel brackets **16**, and extend through the tubes **54**. These tubes **54** are fastened on one end to the activation assembly housing **60** and on the other to the housing **75** of the extendable wheel assembly **12**. Although cables are preferred as the linkage mechanism, it is also possible to use any kind of flexible connector that can be both pushed and pulled, such as flexible wire, or even a rigid member that has jointed portions that allow rotational or pivotal motion at their connections. All such variations are contemplated by the present invention as will be obvious variations to one skilled in the art.

[**0051**] When the extendable handle **26** approaches its upper travel limit, as when extended, the springs **70** push the cross piece **64** away from the housing **60**, drawing the cables **72** back into the tubes **54**, pulling the extension portions **74**. This makes the axel bracket **16** rotate about the pivot **20**, thus pushing the wheels **14** into extended position **76**. This is the position assumed at the beginning of operation in **FIG. 5**. When the extendable handle **26** is pushed down, the central linkage member **62** is also pushed downward against the biasing springs **70**. This also causes the cables **72** to be pushed inside the tubes **54**, in the direction of the direction arrow, pushing on the extension tabs **74**, causing them to rotate about pivots **20**, and the wheels **14** to retract. This motion is continued in **FIG. 6**, until the wheels **14** come to rest in the wheel wells **22** contained in the moldings **18**. These have been removed in **FIGS. 5 and 6** for easier viewing, but it is to be understood that they would appear to be greater in depth than the thickness of the wheels **14**, so that the wheels **14** are preferably completely contained in the wheel wells **22** and are thus protected from catching on exterior items.

[**0052**] The frame **28** of the extendable handle assembly **26** preferably includes a number of detents **80**, some of which are not visible in the figures. These may be in the form of a steel ball, which is spring biased into a hole in the frame, or other such mechanism. These detents **80** serve to maintain the extendable handle assembly **26** in an extended position **76**, when pulled out, and to maintain it in a retracted position **78**, when pushed in. These detents also serves to insure that the wheels **14** remain in retracted position **78** or extended position **76**, as required, thus making sure that the wheels **14** are secure for rolling on, or that they are maintained out of the way.

[**0053**] Although the handle **26** is designed to activate both wheels on both sides at once, **FIG. 3** shows a rear plan view of a theoretically split handle in which one wheel is in the retracted position **78** and one is in the extended position **76**.

[**0054**] **FIG. 7** shows a cross-sectional view as seen from line **7-7** in **FIG. 3**, and **FIG. 8** shows a cross-sectional view as seen from line **8-8** in **FIG. 3**. Once again, there is one wheel **14** in retracted position **78** and one wheel in the extended position **76**.

[**0055**] **FIG. 9** illustrates an isometric view of the extendable wheel assembly **12** in retracted position **78**, including the wheel **14**, axel bracket **16**, molding **18** and wheel well **22**.

[**0056**] **FIG. 10** shows a front plan view of the extendable wheel assembly **12** in retracted position **78**, including the wheel **14**, axel bracket **16**, molding **18** and wheel well **22**.

[**0057**] **FIG. 11** shows a cross-sectional view of the extendable wheel assembly **12** in retracted position **78**, including the wheel **14**, axel bracket **16**, molding **18** and wheel well **22**, as seen from line **11-11** in **FIG. 10**.

[**0058**] FIGS. **12-15** illustrate bottom, top, front and side plan views of the extendable handle assembly **26**, including the housing **60**, side members **66**, inner members **56**, outer housing members **58**, cross piece **30**, tubes **54**, and activation assembly **50**.

[**0059**] FIGS. **16-20** illustrate an alternative embodiment of a luggage bag **100** with handle-activated wheel deployment system **11** which uses a modified activation assembly **50** to move the wheels **14**. Where the elements are similar in function to those previously discussed, the same element numbering will be used.

[0060] As before, the luggage bag **100** has an extendable wheel assembly **12**, which includes a pair of wheels **14**, which are rotatably attached to a pair of axel brackets **16**, which are in turn pivotally attached to a molding **18**, by pivots **20**. There are two wheel wells **22** into which the wheels **14** retract when not extended. The luggage bag **100** also includes an extendable handle assembly **26**, which includes a handle housing **28** and a cross piece **30**. The extendable handle assembly **26** has extendable members **25**, which preferably include a first stage tube **102**, a second stage tube **104** and a third stage tube **106**, which telescope within each other to make a telescoping handle assembly **110**. The lower portion of the third stage tube **106** is enclosed in an outer housing **108** which is attached to the luggage bag body by a housing fixture **118**.

[0061] The activation assembly **50** includes a linkage **49** having a cable **72** which slides within a tube **54**, and also within a first cable neck **114**, which is fixed within a first cable neck housing **116**, which is in turn fixed within the outer housing **108**. A second cable neck **122** and second cable neck housing **124** are also fixed to the luggage bag body and remain stationary while the cable **72** slides within them. The cable **72** has a first cable head **112**, which is enlarged and a second head **120**, which is also enlarged. The first cable head **112** is attached at or near the bottom of the third stage tube **106**, and moves with this third stage **106**. The second cable head **120** is fixed within a movable block **126**. Since the tube **54** is anchored by the first and second cable neck housings **116**, **122** the motion of the first cable head **112** as it follows the movement of the third stage tube **106** is transmitted to the cable second head **120** and thus to the block **126**.

[0062] As shown in **FIG. 19**, and FIGS. **20**A-B, this motion causes the block **126** to be pulled toward the second cable neck housing **124**, when the third stage tube **106** moves upwards (the handle is extended). This motion is from left to right in **FIG. 20**A, and causes block **126** to push on a first extension tab **128** on the axle bracket **16**, thus urging the axel bracket **16** and wheel **14** to pivot clockwise, as shown by the direction arrow and thus extend. When the third stage tube **106** moves back down, (the handle is retracted) the block **126** is pushed as in **FIG. 20**B, so that it pushes the second extension tab **130** and the wheel **14** moves counter-clockwise, as shown, to retract.

[0063] Although only a first extendable wheel assembly **12** is shown, it is to be understood that the second extendable wheel assembly preferably works in unison with the first in response to movement of the handle, although, as before, it is possible that if a split cross-piece is used, that they may act independently of each other. Also, although cables are preferred as the linkage mechanism, it is also possible to use any kind of flexible connector that can be both pushed and pulled, such as flexible wire, or even a rigid member that has jointed portions that allow rotational or pivotal motion at their connections. All such variations are contemplated by the present invention as will be obvious variations to one skilled in the art.

[0064] **FIG. 18** shows an optional locking mechanism **150** which is included in the handle **24**, (only half of which is shown). This locking mechanism includes a release button **152** attached to an extension **154** having a slanted end member **156**, which contacts a second slanted end member **158** of a connector **160**. This pushes a third slanted end member **162**, which then pushes a rod **164** which connects to a series of connecting members **166** and which then retract one or more retention members **168**, which are spring loaded to press into detents **170**. The telescoping handle assembly **110** handle is then allowed to extend to a point where the retention members **168** engage a second set of detents **170**, locking the handle into its extended position. When the release button **152** is again pushes, the retention members are again released, and the telescoping handle assembly **110** is allowed to collapse.

[0065] While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of a preferred embodiment should not be limited by any of the above described exemplary embodiments, but should be defined only in accordance with the following claims and their equivalents.

Industrial Applicability

[0066] The present luggage bags **10**, **100** are well suited for application in transporting personal items by providing extendable wheels **14** which aid in rolling the luggage bag **10** from place to place, and allowing the wheels **14** to retract when not in use by use of a handy and convenient mechanism. The movement of the wheels **14** is coupled to the movement of the handle assembly **26**, as it extends or retracts, making it very convenient for the user, who does not need to bend over to manipulate the positioning of the wheels.

[0067] In operation, the user of the luggage bag **100** pushes the optional release button **152** attached to an extension **154** having a slanted end member **156**, which contacts a second slanted end member **158** of a connector **160**. This pushes a third slanted end member **162**, which then pushes a rod **164** which connects to a series of connecting members **166** and which then retract one or more retention members **168**, which are spring loaded to press into detents **170**. The telescoping handle assembly **110** handle is then allowed to extend to a point where the retention members **168** engage a second set of detents **170**, locking the handle into its extended position. When the release button **152** is again pushes, the retention members are again released, and the telescoping handle assembly **110** is allowed to collapse.

[0068] As the extendable handle assembly **26** extends, the activation assembly **50** causes a linkage **49** including a cable **72** to slide within a tube **54**, and also within a first cable neck **114**, which is fixed within a first cable neck housing **116**, which is in turn fixed within the outer housing **108**. A second cable neck **122** and second cable neck housing **124** are also fixed to the luggage bag body and remain stationary while the cable **74** slides within them. The cable **72** has a first cable head, which is enlarged and a second head **120**, which is also enlarged. The first cable head **112** is attached at or near the bottom of the third stage tube **106**, and moves with this third stage **106**. The second cable head **120** is fixed within a block **126**. Since the tube **54** is anchored by the first and second cable neck housings **116**, **122** the motion of the first cable head as it follows the movement of the third stage tube **106** is transmitted to the cable second head **120** and thus to the block **126**.

[0069] This motion causes the block **126** to be pulled toward the second cable neck housing **124**, when the third

stage tube **106** moves upwards (the handle is extended). This motion causes block **126** to push on a first extension tab **128** on the axle bracket **16**, thus urges the wheel **14** to pivot clockwise, and thus extend. When the third stage tube **106** moves back down, (the handle is retracted) the block **126** is pushed, so that it pushes the second extension tab **130** and the wheel **14** moves counter-clockwise, to retract.

[**0070**] This provides a very easy and convenient mechanism by which the user may either extend or retract the wheels without having to bend over and manually adjust the wheels. Travelers, who may have their hands full with other items will appreciate its ease of operation, which may be performed with on hand, and the compact configuration that the bag assumes when the wheels and handle are retracted.

[**0071**] For the above, and other, reasons, it is expected that the luggage bags **10**, **100** of the present invention will have widespread industrial applicability. Therefore, it is expected that the commercial utility of the present invention will be extensive and long lasting.

LUGGAGE BAG WITH HANDLE-ACTIVATED WHEEL DEPLOYMENT SYSTEM
SANFORD-SCHWENTKE, Anthony
Atty. ref.: 60349-304701 (NRTHPO47A)
THIS CORRESPONDENCE CHART IS FOR EASE OF UNDERSTANDTNG AND INFORMATIONAL PURPOSES ONLY, AND DOES NOT FORM A PART OF THE FORMAL PATENT APPLICATION.

2	axis of rotation
10	luggage bag
11	handle-activated wheel deployment system
12	extendable wheel assembly
14	wheels
16	axel brackets
18	molding
20	pivots
22	wheel wells
24	carrying handle
25	extendable members
26	extendable handle assembly
28	handle frame
30	cross piece
32	front side
34	back side
36	first side
37	enclosure
38	second side
40	top
42	bottom
44	lid
46	body
48	zipper
49	linkage
50	activation assembly
54	tubes
56	inner member
58	outer member
60	activation assembly housing
62	central linkage member
64	linkage cross piece
66	side members
68	prongs
70	springs
72	cables
74	extension tabs
75	wheel pivot assembly housing
76	extended position
78	retracted position
80	detents

-continued

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100	alternate embodiment
102	first stage tube
104	second stage tube
106	third stage tube
108	outer housing
110	telescoping handle assembly
112	first cable head
114	first cable neck
116	first cable neck housing
118	housing fixture
120	second cable head
122	second cable neck
124	second cable neck housing
126	block
128	first extension tab
130	second extension tab
150	locking mechanism
152	release button
154	extension
156	first slanted end member
158	second slanted end member
160	connector
162	third slanted end member
164	rod
166	connecting member
168	retention member
170	detent holes

What is claimed is:

1. A luggage bag with an enclosure for containing articles to be transported, and including a handle activated wheel deployment system, comprising:

an extendable handle assembly having a plurality of extendable members, and a cross piece joining said extendable members;

a plurality of extendable wheel assemblies having extendable wheels which are movable from a retracted position to an extended position, said extendable wheel assemblies each including an axel bracket which is rotatable about a pivot, said axel bracket also having at least one extension tab;

an activation assembly including a linkage which connects said extendable handle assembly and at least one of said extendable wheel assemblies, such that extension of said extendable handle assembly causes extension of at least one of said extendable wheels, said activation assembly acting to move said at least one extension tab to pivot said wheels to extend said wheels and also to move said at least one extension tab to pivot said wheels to retract said wheels.

2. The luggage bag of claim 1, wherein:

said at least one extension tab includes a first extension tab and a second extension tab.

3. The luggage bag of claim 2, wherein:

said activation assembly includes a block which acts to push said first extension tab to extend said wheels and acts to push said second tab to retract said wheels.

4. The luggage bag of claim 1, wherein:

said at least one extension tab is a single extension tab which is pulled by said linkage to pivot said wheels to said extended position, and which is pushed by said linkage to pivot said wheels to said retracted position.

5. The luggage bag of claim 1, wherein:

said activation acts to extend both wheels in unison and also acts to retract both wheels in unison.

6. The luggage bag of claim 1, wherein:

said linkage includes at least one cable.

7. The luggage bag of claim 6, wherein:

each of said at least one cable travels inside a tube that is fixed in position.

8. The luggage bag of claim 3, wherein:

said cable is connected to said block.

9. The luggage bag of claim 1, further comprising:

a locking mechanism which acts to maintain said handle and said wheels in said extended position and also in said retracted position.

10. The luggage bag of claim 9, wherein:

said locking mechanism is activated by a release button.

11. The luggage bag of claim 10, wherein:

said release button is included in said cross piece of said handle.

12. The luggage bag of claim 9, wherein:

said locking mechanism includes retention members which are urged by springs into detent holes.

13. The luggage bag of claim 1, wherein:

said pivots rotate about axes which are substantially parallel to said extendable members.

14. A handle-activated wheel deployment system for luggage, comprising:

an extendable handle assembly having a plurality of extendable members, and a cross piece joining said extendable members;

a plurality of extendable wheel assemblies having extendable wheels which are movable from a retracted position to an extended position, said extendable wheel assemblies each including an axel bracket which is rotatable about a pivot, said axel bracket also having at least one extension tab;

an activation assembly including a linkage which connects said extendable handle assembly and at least one of said extendable wheel assemblies, such that extension of said handle assembly causes extension of at least one of said extendable wheels, said activation assembly acting to move said at least one extension tab to pivot said wheels to extend said wheels and also to move said at least one extension tab to pivot said wheels to retract said wheels.

15. The handle-activated wheel deployment system of claim 14, wherein:

said at least one extension tab includes a first extension tab and a second extension tab.

16. The handle-activated wheel deployment system of claim 15, wherein:

said activation assembly includes a block which acts to push said first extension tab to extend said wheels and acts to push said second tab to retract said wheels.

17. The handle-activated wheel deployment system of claim 14, wherein:

said at least one extension tab is a single extension tab which is pulled by said linkage to pivot said wheels to said extended position, and which is pushed by said linkage to pivot said wheels to said retracted position.

18. The handle-activated wheel deployment system of claim 14, wherein:

said linkage includes at least one cable.

19. The handle-activated wheel deployment system of claim 18, wherein:

each of said at least one cable travels inside a tube that is fixed in position.

20. The handle-activated wheel deployment system of claim 19, wherein:

said cable is connected to said block.

21. The handle-activated wheel deployment system of claim 14, further comprising:

a locking mechanism which acts to maintain said handle and said wheels in said extended position and also in said retracted position.

22. The handle-activated wheel deployment system of claim 14, wherein:

said pivots rotate about axes which are substantially parallel to said extendable members.

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