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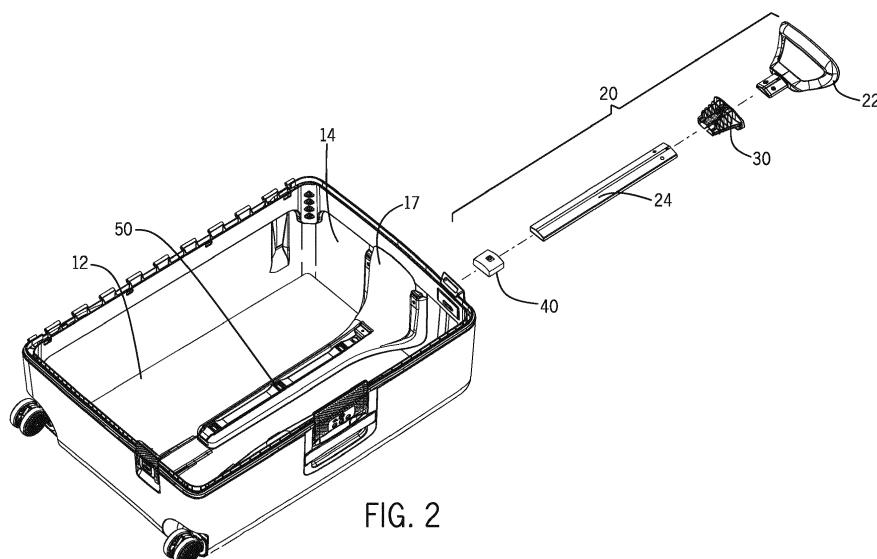
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**(54) Integrated pull handle for a luggage case**

(57) A luggage case (5) is provided, with the luggage case defining a back panel (12), a top panel (14), and a handle assembly (20). The luggage case includes (5) a lower tubular handle section (50) integrally formed within the back panel (12) and extending at least a portion of the length of the back panel (12). The luggage case includes (5) a sliding handle section (24, 40) formed of at least one tubular member (24) telescopically received within the lower tube section (50) and configured to extend from the lower tube section (50). The luggage case includes (5) a grip portion (22) positioned adjacent an

upper end of the sliding handle section (24, 40); and a releasable engagement mechanism (21) operable to selectively position the sliding handle section (24, 40) along the length of the lower tubular handle section (50). The luggage case (5) also includes a top bracket insert (30) received into a first end portion of the lower tubular handle section (50) proximate the exterior of the luggage case (5); and the top bracket insert (30) receiving the tubular member (24) such that the top bracket insert (30) guides the tubular member (24) relative to the lower tubular handle section (50).



**FIG. 2**

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## Description

### Technical Field

**[0001]** The present invention relates to luggage cases, and in particular to a lower pull handle integrated with the shell of luggage cases.

### Background

**[0002]** Many luggage cases often include both a carry handle and an extendable pull handle. A user typically lifts the luggage by the carry handle, and guides or tows the luggage with the extended pull handle. The extendable portion of the pull handles collapse into a lower portion of the pull handle. These two portions of the pull handle are sometimes attached to the framework or the shell of the luggage cases. This design relies on multiple handle components and assembly, which includes high costs associated with manufacturing the luggage case. In many instances the lower tubular handle section is visible on the exterior of the luggage case. The exterior handle decreases the visual appeal of the luggage case and can increase the likely hood of failure or interfering with the nearby environment.

**[0003]** Documents that may be related to the present disclosure in that they include various approaches to luggage tow handle structure include US8534434, US6948601, US20140041978, CN201312609Y, US6202254, US6434790, and US6279706. These proposals, however, may be improved.

**[0004]** It is therefore desirable to provide an improved luggage case or case, and in particular an improved luggage pull handle assembly, and even more specifically an improved lower tubular handle section which is integrally formed as a part of the luggage shell and telescopically receiving at least one upper handle section.

### Summary

**[0005]** According to the present invention there is therefore provided a luggage case having a lower tubular handle section integrally formed as described in the accompanying claims.

**[0006]** The present disclosure in particular provides a telescopic pull handle including a lower tubular handle section integrally formed within the rear panel of a luggage case. The lower tubular handle section extends at least a portion of the length of the rear panel. The telescopic pull handle also includes a sliding handle section formed of at least one tubular member telescopically received within the lower tube section and configured to extend from the lower tube section. A grip portion may be positioned adjacent an upper end of the sliding handle section. The telescopic pull handle may include a releasable engagement mechanism operable to selectively position the sliding handle section (along the length of the lower tubular handle section. The telescopic pull handle

may include a top bracket insert received into a first end portion of the lower tubular handle section proximate the exterior of the luggage case. The top bracket insert may receive the tubular member such that the top bracket insert guides the tubular member relative to the lower tubular handle section.

**[0007]** In various examples, the top bracket insert may further include first protrusion for engaging a first aperture to secure the top bracket insert within the lower tubular handle section. The top bracket insert may further include a second protrusion for engaging a second aperture within the lower tubular handle section aligning the top bracket insert within the lower tubular handle section. The first snap feature may be larger than the second snap feature, with the second snap feature being distal to the handgrip relative to the first snap feature. The top bracket insert may include a plurality of ribs that provide a tapered or flared shape to the top bracket insert such that a first end of the top bracket insert proximal to the grip portion is larger, such as in peripheral circumference or major diameter, than the second end of the top bracket insert distal of the grip portion.

**[0008]** In various examples, the telescoping pull handle may further include a guide collar received into an end of the tubular member opposite the handgrip. The guide collar may contact the interior of the lower tubular handle section such that the guide collar is operable as a slidable bushing between the interior of the lower tubular handle section and the exterior of the tubular member.

**[0009]** In various examples, the releasable engagement mechanism may include a movable locking pin that extends out of the guide collar toward the lower tubular handle section. The lower tubular handle section may include one or more apertures extending from the interior of the lower tubular handle section into the interior of the luggage case. The releasable engagement mechanism may include a button located within the grip portion. The locking pin may be in mechanical communication with the button such that in response to depressing the button the locking pin is moved inward allowing the locking pin to move past each of the one or more apertures without engaging. The locking pins may be aligned with and operable to automatically extend into at least one of the plurality of apertures in response the guide collar being moved to align the locking pin longitudinally with each of the plurality of apertures and thereby providing engagement between the locking pin and at least one of the plurality of apertures for securing the handle assembly after adjustment.

**[0010]** In various examples, the lower tubular handle section may be integrally formed in the luggage case by injection molding. The lower tubular handle section may be a longitudinal tubular structure positioned along the back panel with a plurality of walls. One of the plurality of walls may be a common wall with the back panel of the luggage case. The integrally formed lower tubular handle section may receive substantially the full length

of the tubular member. The back panel, top panel and lower tube section may be injection moulded.

**[0011]** In accordance with various embodiments a luggage case may be formed by plastic injection molding an integral back panel, top panel and lower tube section. A sliding handle section may be formed with a handgrip located on a first end of the sliding handle. The sliding handle section may be received into a top bracket insert. A guide collar may be affixed to a second end of a sliding tube opposite the first end. The sliding handle section may be received into the lower tubular handle section, with the guide collar extending into the lower tubular handle section and the handle remaining exterior to the lower tubular handle section. The top bracket insert may be locked into an end of the lower tubular handle section proximal to the top panel by engaging a protrusion through an aperture extending through the lower tubular handle section. The guide collar may be engaged into one of a plurality of apertures extending through the lower tubular handle section with a locking pin button on the handle.

**[0012]** Additional embodiments and features are set forth in part in the description that follows, and will become apparent to those skilled in the art upon examination of the specification or may be learned by the practice of the disclosed subject matter. A further understanding of the nature and advantages of the present disclosure may be realized by reference to the remaining portions of the specification and the drawings, which forms a part of this disclosure. One of skill in the art will understand that each of the various aspects and features of the disclosure may advantageously be used separately in some instances, or in combination with other aspects and features of the disclosure in other instances.

#### Brief Description of the Drawings

**[0013]** The description will be more fully understood with reference to the following figures in which components are not drawn to scale, which are presented as various embodiments of the disclosure and should not be construed as a complete recitation of the scope of the disclosure, characterized in that:

Fig. 1A is a rear perspective of a luggage case with a handle in a fully extended position.

Fig. 1B is a rear perspective of the luggage case of Fig. 1A with a handle in a fully retracted position.

Fig. 1C is a rear view of the luggage case of Fig. 1B.

Fig. 1D is a top view of the luggage case of Fig. 1B.

Fig. 2 is an exploded view of a telescopic pull handle and the inside of the rear luggage case portion.

Fig. 3A is front perspective view of the telescopic pull

handle of Fig. 1A.

Fig. 3B is rear perspective view of the telescopic pull handle of Fig. 1A.

Fig. 4A is a perspective view of the inside of the rear luggage case portion.

Fig. 4B is a cross-sectional view of the lower tubular handle section without the pull handle installed as taken from section line 3B in Fig. 2.

Fig. 4C is a detailed view of the lower tubular handle section with a top bracket insert installed as viewed in the detailed section of Fig. 4A.

Fig. 4D is a cross-sectional view of the lower tubular handle section cut through a guide collar and locking pin as taken from the section line D in Fig. 4A.

Fig. 4E is a cross-sectional view of the lower tubular handle section cut longitudinally through the pull handle assembly, top bracket insert, and the lower handle portion as taken from the section line E in Fig. 4A.

Fig. 5A is a cross-sectional view of an injection molding apparatus forming the lower handle portion integrally with the luggage case back panel.

Fig. 5B is a detailed view of the injection molding apparatus of Fig. 5A as viewed at the end of the lower handle portion intersection between the upper tool and the slide tool.

#### Detailed Description

**[0014]** The present disclosure provides an improved handle structure for a luggage case. Particularly, a portion of the extendable handle may be integrally formed with the back panel of the luggage case. Due to the manufacturing processes and the user focus of the luggage industry, typical luggage cases utilize a lower handle section that is separate from the luggage case but attached thereto with fasteners, brackets or the like. The present disclosure describes a luggage case that reduces the complexity and costs of some luggage cases by providing a lower tubular handle section that is integrally formed with the shell of the luggage case. This integrated lower tubular handle section may receive a sliding handle assembly, which may include a tubular member. Additionally, the use of features moulded into the lower integral tubular section may be engaged by features of the sliding member, as such a synergistic hybrid of the integral features and sliding features substantially simplifies the luggage case. The tubular member may be connected to a lower guide collar that is operable as a bushing between the tubular member and the lower tubular handle section. An upper bracket may mount within the integrated lower

tubular handle section where the integrated lower tubular handle section opens to an exterior top panel of the luggage case. This upper bracket may operate as a bushing between the tubular member and the integrated lower handle portion. The end of the tubular member proximal to the exterior of the case may have a grip portion with a grip mounted thereon. The grip portion, tubular member, and guide collar may telescopically slide in and out of the integral lower handle portion. The integrated lower handle section may have many benefits, including that it structurally supports the panel of the luggage on which it is formed, protects the luggage contents from the handle structure, reduces the weight of the luggage case, and/or simplifies assembly.

**[0015]** Figs. 1A and 1B illustrate an example of rear perspective views of a luggage case with a pull handle in a fully extended position (see Fig. 1A) and in a collapsed position (see Fig. 1B). Fig. 1C illustrates an example of a rear view of the luggage case. Fig. 1D illustrates an example of a top view of the luggage case. Referring to Fig. 1A and 1B, a hard sided luggage case 5 includes a front panel 4, a rear panel 12, a top panel 14, a bottom panel 15, a right side panel 13, and a left side panel 16. The panels are connected to each other to form the luggage case housing. The luggage case may also include a closure mechanism 19, such as a zipper that extends along the central portions of the side panels and the top and bottom panels, and defines a line of closure, which divides the luggage case into two shell portions 6, 7. A hinge 9, as shown in Fig. 1D, for pivotally connecting the two shell portions is positioned along a length of the closure mechanism. The closure mechanism can be disconnected (e.g. unzipped) to allow the two shell portions to pivot about the hinge portion to allow access to the interior. Many types of closure mechanisms and hinge structures may be utilized for connecting the two shell portions. The luggage case preferably also includes four spinner type wheels 10 as shown, or may include other wheel structures, to allow the user or towing the luggage case at an angle, or to guide it along in an upright position. The luggage case may also include a side carry handle 8 on a side panel and a top carry handle 8 on the top panel 14. While described herein with reference to a hard sided luggage case having spinner wheels, the improvements described herein may also be advantageously implemented on other types of luggage, including hybrid cases (i.e. including both hard side and soft side), or other luggage cases having an extendable pull handle mounted in a hard sided material portion.

**[0016]** As shown in Fig. 2, the luggage case 5 may include a handle assembly 20 which may be aligned along the rear panel 12 but positioned inside the luggage case. As shown in Fig. 2, the pull handle assembly 20 may include for example, a slidable handle section and an integral handle section. The slidable handle sections may include one or more tubular members 24, a guide collar 40, a grip portion 22, an engagement mechanism 21 (not shown here) and/or any other slidable component

in the handle assembly 20. While a top bracket insert 30 is shown in Fig. 2 with the slidable handle assembly portion, it is to illustrate an example assembly position. However, the top bracket insert 30 may not be considered to be a part of the extendable handle portion as it is fixed relative to the luggage case 5 and an integral lower tube 50 and not extendable or movable itself.

**[0017]** Referring to Figs. 2 and 3, at least one tubular member 24 may be telescopically received in a lower tubular handle section 50. A guide collar 40 is positioned on one end of the sliding handle section. In various embodiments the guide collar 40 may be positioned on the leading end of the tubular member 24 that is received into the lower tubular handle section 50 telescopically. In various embodiments, a plurality of tubular members 24 may be telescopically received into one another and the outer tube member may be telescopically received into the lower tubular handle section 50. The intermediate tubes may be coupled between the lower tubular handle section 50 and the upper tube connected to a grip portion 22 to allow further extension of the handle assembly 20.

**[0018]** Still Referring to Figs. 2 and 3, the luggage case 5 may include a receiving assembly. For example, the receiving assembly may include a top bracket insert 30 and a lower tubular handle section 50. The top bracket 30 may receive the tubular member 24 and be positioned between the lower tubular handle section 50 and the tubular member 24. The lower tubular handle section 50 may receive the top bracket insert 30 into a matching recess formed around the top opening of the lower tubular handle section 50. When received in the recess, the aperture formed in the top bracket insert 30 is aligned with the opening of the lower tubular handle section. In this way, the top bracket insert 30 may receive and retain the tubular member 24, limiting movement side to side and front to back within the lower tubular handle section 50. The top bracket 30 may provide stiffness to prevent bending and local reinforcement, which may make the handle assembly more robust during heavy usage of the luggage case by a user.

**[0019]** In accordance with various embodiments, one or more of the tubular members 24 may be characterized generally as an elongated member, and may be hollow. Alternatively, the at least one tubular member 24 may be substantially solid in cross section. In instances where one or more tubular members 24 are telescopically received into one another, the different tubular members 24 may have different cross sectional shapes and/or sizes (e.g. round, rectangular, triangular or any other shape and may correspond to the shape of the integrally formed handle section). In either embodiment, the at least one tubular member 24 is movable relative to either the lower tubular handle section 50 and/or movable relative to other respective lengths of tubular members telescopically received within the lower tubular handle section 50.

**[0020]** Referring to Fig. 2, the lower tubular handle section 50 may receive the tubular member 24 via an alignment feature. For example, the alignment feature may

include the top bracket insert 30, which may be positioned between the tubular member 24 and the lower tubular handle section 50. In this way, the top bracket insert 30 may function as a bushing or bearing surface between the tubular member 24 and the lower tubular handle section 50. The top bracket insert 30 may attach to the shell of luggage case 5. For example, the top bracket insert 30 may be received into the lower tubular handle section 50, which may be integrally formed with the rear panel 12. As illustrated in Figs. 3A and 3B, the top bracket insert 30 may be shaped to fit the opening of the lower tubular handle section 50. For example, the top bracket insert 30 may have a front side (e.g. Fig. 3A) and a back side (e.g. Fig. 3B), with the front side including a plurality of locating features, and the back side having a substantially flat area 35 operable to conform to the exterior of the luggage case. The flat area 35 of the top bracket insert 30 may be proximal to the back panel 12 providing flat engagement with this side of the luggage case. The backside 35 may include a plurality of low profile reinforcing ribs. Additionally, the top bracket insert 50 may have a wedge shape. For example, the first side of the top bracket insert 30 may have a top plate 32 operable to rest substantially flush with the exterior of the luggage case 5. The top bracket insert 30 may taper down from the first side to a second side. The second side of the top bracket insert 30 may have a cross section similar in size or slight larger than the tubular member 24. This taper may conform to the opening of the lower tubular handle section 50 on the exterior of the luggage case.

**[0021]** The top bracket insert 30 may be operable to receive one or more slidable portions of the handle assembly 20. Referring to Fig. 4E, the top bracket insert 30 may have an aperture 37 extending through its center. The aperture 37 may have a profile similar to the exterior profile of tubular member 24 such that there is a slidable but secure fit between aperture 36 and tubular member 24. The tubular member 24 may slide back and forth with in and relative to the aperture 37.

**[0022]** As indicated above, the top bracket insert 30 may have a plurality of locating features on the front side. An example of a locating feature may include keying features operable to key into apertures within the lower tubular handle section 50. Referring again to Fig. 3A, a keying feature may include locating protrusion 36a which may extend from one side of the top bracket insert 30. The locating protrusion 36a may be operable to engage with an engaging feature formed with the shell of the luggage case, such as aperture 54a formed through a wall of the lower tubular handle section 50. When the top bracket insert 30 is located longitudinally within the lower tubular handle section 50, the aperture 54a may receive protrusion 36a. In various embodiments, the top bracket insert 30 may include more than one keying feature. While one keying feature may limit lateral and longitudinal movement, a second keying feature may limit rotational movement. For example, the second keying feature may include a second locating protrusion 36b, which may

match and engage a second aperture 54b. The keying features may also be aligned but may be keyed differently with respect to the corresponding engagement feature on the lower tubular handle section 50. For example, the first locating protrusion 36a may be aligned vertically with the second locating protrusion 36b. The two protrusions 36a, b may be slid into the lower tubular handle section 50 longitudinally, with the first locating protrusion 36a entering the lower tubular handle section 50 first, and the second locating protrusion 36b following. The protrusions may be slide into the lower tubular handle section 50 without engaging one another's respective apertures. In various examples, this may be accomplished by sizing the protrusions and apertures differently. For example, the first protrusion 36a may be a larger size than the second protrusion 36b. By being a larger size, protrusion 36a may avoid engaging with the wrong aperture (e.g. 54b), which it encounters first, but passes easily, because the wrong aperture may be a smaller size than protrusion 36a.

**[0023]** The top bracket insert 30 may further include a locating feature on the backside 35. Positioning a locating feature on the backside may allow for an engagement opposite the first and/or second locating features 36a, 36b located on the front side of the top bracket 30. Opposing features may allow for an engagement without the use of fasteners by providing interfaces with both sides of the top bracket insert 30 and with both the luggage case back panel and the lower handle section proximal the interior of the case. In one example, a protrusion 39 may extend from the flat area of the back panel. This protrusion may be round, square, or any other shape. As shown in Figs 1A-B, this protrusion 39 may be oblong. Additionally, the back panel 12 of the luggage case may include a corresponding aperture 3. The aperture 3 may receive the protrusion 39 as the top bracket insert 30 is slid into the opening of the lower handle section proximal to the top panel of the luggage case. As one or more of the protrusions 36a, b are received into their one or more corresponding apertures 54a, b, the protrusion 39 may also be received into aperture 3 formed on the opposite side of the lower handle section than apertures 54a, b. Note that in various embodiments, any one or more of the apertures 54a, 54b, and 3 may be included and similarly any one or more of locating features 36a, 36b, or 39 may be included with or without the inclusion of the others..

**[0024]** The top bracket insert 30 may also have an aperture 34 operable to receive a fastener to securely fasten the top bracket insert to the luggage case 5. This fastener may be aligned with the one or more locating protrusions 36a, 36b and be positioned on the same side of the top bracket insert 30 as the one or more locating protrusions 36a, 36b.

**[0025]** As Shown in Fig. 3A, the top bracket insert 30 may include longitudinal locating features. For example, the longitudinal locating features may include one or more longitudinal ribs, such as spaced-apart longitudinal

ribs 31. The longitudinal ribs 31 may be positioned on the front side of the top bracket insert 30 and on either side of the keying features (e.g. protrusion 34a, 34b). The longitudinal ribs 31 may extend in the same direction but farther than the keying features. This orientation may form a channel between the longitudinal ribs 31 that the keying features reside in. Another set of longitudinal ribs 33 may extend along the sides of the top bracket insert 30. Each side of the top bracket insert 30 may have a pair of spaced apart ribs 33. The ribs 31 and/or the ribs 33 may extend from a first side of the top bracket insert 30 to a second side of the top bracket insert 30. The side ribs 33 may taper from a large side proximal to the top plate 32 to being shorter to zero height proximal to the opposite end of the top bracket insert 30. This taper may give the top bracket insert 30 a wedge shape appearance which may in turn mate with a similar shape formed at the opening of the lower handle portion 50.

**[0026]** Referring to Fig. 2 and 4A, the lower tubular handle section 50 may be integrally formed into a panel of the luggage case 5. The lower tubular handle section 50 may be formed on the interior of the luggage case 5 such as along the rear panel 12 and in some embodiments the lower tubular handle section 50 may be positioned centrally along the rear panel 12. The lower tubular handle section 50 may extend along at least a portion of the height of the rear panel 12. In one example, the lower tubular handle section 50 may extend at least partially down the rear panel 12 from the top panel 14. In another example, the lower tubular handle section 50 may extend the entire length of the rear panel 12 from the top panel 14. In another example, the lower tubular handle section 50 may extend up from the bottom panel. The lower tubular handle section 50 may have a length down the rear panel 12 sufficient to enclose at least a portion of the length of tubular member 24 and in some embodiments the full length of the tubular member 24. As shown in Fig. 4B, which depicts a cross-sectional view of the interior 51 of lower tubular handle section 50 without the pull handle installed, the lower tubular handle section 50 may be defined by an opening in the top panel 14 or a recessed panel 17 and with a plurality of walls defining a tubular structure with one of the plurality of walls being common with the rear panel 12. The side walls of the lower tubular handle section 50 may be perpendicular with the rear panel 12 and or may curve upwardly away from the rear panel 12 enclosing a channel operable to receive the handle assembly 20.

**[0027]** In accordance with various embodiments, the lower tubular handle section 50 may have a variety of profiles. For example, referring to Fig. 4C, the handle section may have a first profile 50a that remains generally consistent along the length. A consistent profile may allow the lower tubular handle section to receive the tubular member 24 or a guide collar 40 consistently along its length. In other examples, the first profile 50a may vary along the length, such as tapering down in size from the opening proximal to the top panel to the opposite end.

This taper may simplify manufacturing by making a side pull of a tool easier. The lower tubular handle section 50 may have other profiles such as second profile 50b. Profile 50b may be a flare transition between the first profile 50a and the opening proximal to the top panel. As discussed above, the top bracket insert 30 may be wedged shaped and the second profile 50b may correspond to the shape of the top bracket insert 30. In some examples, the wall thickness of the lower tubular handle section 50 may be consistent along its length. In some examples, the wall thickness of the lower tubular handle section 50 may vary along its length. As illustrated in Figs 2 and 4A, E, the lower tubular handle section 50 may be enclosed along its length. In other examples, the lower handle section 50 may be open along a portion or all of its length forming a channel. For example one of the walls shown in the Figs 2 and 4A, E may be absent, but the lower handle section 50 may still have sufficient structural support so that the sliding portion of the handle assembly 20 may be retained therein. In various examples, the lower tubular handle section 50 may have been defined by any of a variety of cross sections. For example, the cross sectional profile of the lower tubular handle section 50 may be round, triangular, rectangular, or any other shapes. In various examples, specifically as shown by the example of Fig. 4D, the lower tubular handle section 50 may be substantially rectangular.

**[0028]** As illustrated in Figs 4B-4D, the interior 51 of lower tubular handle section 50 may include one or more features operable to position, guide, or retain the handle assembly 20. For example, the lower tubular handle section 50 may include a recess along the length thereof. This recess may include a projecting surface 55 that may be formed within the lower tubular handle section 50 opposite the wall formed commonly with rear panel 12. The projecting surface 55 may extend into the interior 51 of the lower tubular handle section 50 toward the common rear wall 12. The longitudinal ribs 31 may be spaced such that the projecting surface 55 fits between the ribs providing a locating feature between the lower tubular handle section 50 and the top bracket insert 30.

**[0029]** One or more sliding support surfaces 57, 59 may be provided along the plurality of walls within the lower tubular handle section 50. These sliding support surfaces 57, 59 may be positioned on the plurality of walls of the lower tubular handle section 50 such that they engage either the tubular member 24 or the guide collar 40. The sliding support surfaces 57, 59 may be on each of the walls with opposing support surfaces (i.e. support surfaces on opposing walls) being parallel to one another. For example, sliding support surface 57 may be positioned on both sidewalls with the sliding support surfaces 57 on the sidewalls being parallel even if the opposing sidewalls are not parallel (e.g. the opposing side walls may have a draft to remove a forming tool during an injection molding process.) Sliding support surface 59 may be positioned on the top wall (i.e. projecting surface 55) and the bottom wall (i.e. rear panel 12). Opposing sliding sup-

port surfaces 59 may also be parallel even if the projecting surface 55 and the rear panel 12 are not. In various embodiment's, the sliding support surfaces may protrude from their base surfaces (i.e. side walls, rear panel, or projecting surface) and may hold tighter tolerances to their opposing surfaces than the base surface. These tighter tolerances may allow better fitment of the tubular member 24 or the guide collar 40 within the lower tubular handle section 50. The parallel surface may allow smooth sliding of the tubular member 24 or the guide collar 40 within the lower tubular handle section 50.

**[0030]** Referring to Fig. 4B, a plurality of structural elements may be formed within the lower tubular handle section 50. The plurality of structural elements aid in locating other elements or they may provide strength to the lower tubular handle section 50. These attributes improve the reliability of the luggage case as the top bracket insert and lower tubular handle section 50 engagements may be subject to high stresses to the leverage asserted on an extended handle. In one example, the structural elements may include positioning ribs 53, which may be formed within the lower tubular handle section 50 proximal to the opening at the top panel 14. The positioning ribs 53 may be positioned along the second profile 50b, which flares out towards the opening at the top panel 14. Adjacent positioning ribs 53 may have spaces between each rib operable to receive a portion of the top bracket insert 30. As shown in fig. 4B, three positioning ribs 53 may be formed on opposite sides of channel 51. This configuration forms two spaces on each side of the channel 51 operable to receive a portion of the top bracket insert 30. Specifically, one or more side ribs 33 positioned on the top bracket insert 30 may be operable to be received between each of the positioning ribs 53. In this way, the top bracket insert 30 may be restrained from moving in the front to back direction within the channel 51 by the engagement between ribs 53 and side ribs 33. Furthermore, this configuration may provide improved strength further reducing movement and possible failure between the lower tubular handle section 50 and the top bracket insert 30.

**[0031]** Referring to Fig. 4C, the lower tubular handle section 50 may include a plurality of apertures. The plurality of apertures may be operable as locating features. For example, the lower tubular handle section 50 may include an aperture 54a or 54b operable to receive a locating protrusion 36a or 36b on the top bracket insert 30. The aperture 54a or 54b may be located in the wall of the lower tubular handle section 50 directed to the interior of the luggage case 5. For example, the aperture 54a or 54b may extend into the projecting surface 55. The lower tubular handle section 50 may include as enough apertures to correspond to the locating protrusions of top bracket insert 30. For example, if there are two locating protrusions 36a and 36b, then the lower tubular handle section 50 may have two apertures 54a and 54b that correspond to these locating protrusions. Each aperture 54a and 54b may be sized to correspond to the

relative size of the locating protrusion. For example, aperture 54a may be larger than aperture 54b such that locating protrusion 36a may engage aperture 54a but not aperture 54b. The lower tubular handle section 50 may also include an aperture 56 that aligns with aperture 34 such that a fastener can be passed through both apertures. The lower tubular handle section 50 may be sufficiently flexible such that as the top bracket insert 30 is inserted into the lower tubular handle section 50, the wall of the handle section 50 positioned proximal to the interior of the luggage case 5 may flex allowing the protrusions to slide along the longitudinal length of the lower tubular handle section 50. Once the protrusions 36 reach the correct aperture 54a or b the wall of the lower tubular handle section 50 may return to an un-flexed state and snap the aperture 54 a or b over the protrusion 36 a or b. While two protrusions are discussed here, it is to be understood that only one protrusion may be used or more than two protrusions may be used.

**[0032]** Referring back to the handle assembly 20, the handle assembly 20 also may include a grip portion 22. The grip portion 22 may include a handgrip. In a slidable handle assembly 20 collapsed state, the grip portion 22 may be received in a recess 17 in the housing. The recess 17 may allow the grip portion 22 to sit flush with the top panel 14 when fully retracted. In such an embodiment the top plate 32 of the top bracket insert 30 may sit flush with the recess 17. Alternatively, the grip portion 22 may also be positioned in a recessed housing sufficiently deep to be below flush with the top panel 14 when fully retracted. The recess 17, in some examples, may have a shape closely matching the peripheral shape of the grip portion 22 (when viewed from above).

**[0033]** In some examples, the tubular member 24 and grip portion 22 may be formed as one structural unit and are integrally formed by continuous material. In another example, the tubular member 24 and the grip portion 22 may be one structural unit, but may be formed from separate structures joined together to operate as one unit relative to the lower tubular handle section 50. The fully extended position noted above is intended to include lower and upper (and optionally intermediate) positions shorter than the total length attained by the tubes when positioned at their extreme limits, however the total extension length to be considered "fully extended" must be greater than the extension length while in the collapsed position.

**[0034]** The extendable handle assembly 20 also includes a releasable engagement mechanism 21 to selectively secure the length of extendable handle assembly 20. The extendable handle assembly 20 may include an engagement member 26, such as an extendable/retractable pin, that is actuatable by the engagement mechanism 21 to be received in the aperture 52 or through-hole formed in the lower tubular handle section 50 to secure the relative length of extension of the tube member 24 and lower tubular handle section 50 relative to one another. The tube member 24 and lower tubular han-

dle section 50 may have a plurality of discrete lengths of extension ranging from the full length of the tubular member 40 (or full length of a plurality of telescopically extendable tubular members) to the grip portion 22 being flush with the top panel 14.

**[0035]** Referring to Fig. 4E, an actuator, such as a button 27 positioned on the handle grip, may be actuated by the user to cause the engagement mechanism 21 to affect the engagement member 26 as described below. For instance, when actuated or pressed the button 27 causes the engagement mechanism 21 to extract the engagement member 26 from the aperture 52 and allow the tube member 24 and lower tubular handle section 50 to move relative to one another. Releasing the button 27 actuates the engagement mechanism 21 to cause the engagement member 26 to be received in an aperture 52 with which it is aligned to secure the relative positions of the extendable tubes. Examples of relative positions contemplated herein include a fully retracted position without any extension, a slightly extended carry position, and/or at least one fully extended guide position.

**[0036]** As shown in Figs. 4E, the lower tubular handle section 50 may include a first aperture 52a for receiving the engagement member 26 when the extendable handle assembly 20 is a fully retracted position. The lower tubular handle section 50 may also include a second aperture 52b for receiving the engagement member 26 to lengthen the extendable handle assembly 20 by a small amount to the carry position. When the user wishes to move from the retracted position 52a to the carry position 52b, the button 27 is actuated to extract the engagement member 26 from the first aperture 52a. Once the engagement member 26 is retracted, the user may pull the handle assembly 20 upwardly within the lower tubular handle section 50 until the engagement member 26 aligns with and extends into the second aperture 52b, which fixes the tube member 24 and lower tubular handle section 50 relative to one another. The lower tubular handle section 50 may also include a third aperture for receiving the engagement member 26 to lengthen the extendable handle assembly 20 by a larger amount, past the carry position to a fully extended position. There may be more than one position longer than the carry position. The lower tubular handle section 50 may include any number of adjustment apertures.

**[0037]** Referring to Fig. 4E, a guide collar 40 may be coupled to the lower end of tube member 24. For example, one end of the guide collar 40 may include a protrusion 48 that corresponds to the interior of the tubular member 24. In various examples, the guide collar 40 may prevent or limit the tubular member 24 from contacting the walls of the lower tubular handle section 50. The body of the guide collar 40 acts as a spacer and bearing surface between the tubular member 24 and the lower tubular handle section 50 during relative movement. The guide collar 40 may also incorporate a portion of the engagement mechanism 21, as well as house parts of the engagement mechanism 21, e.g. the engagement member

26, that is used in securing the tubular member 24 relative to the lower tubular handle section 50, as described herein. The guide defines a passage 42 which provides a space for the engagement mechanism 21 to pass through the guide collar 40.

**[0038]** The engagement mechanism 21 may include and actuator button 27 supported by a return spring 28a. The button 27 may move a linkage 29 that is operable to move a slide 25. The slide 25 may also have a return spring 28b. The slide 25 may be in contact with engagement member 26. Movement of the slide 25 may release the engagement member 26 from aperture 52 as variously illustrated.

**[0039]** Referring to Fig. 4D, the guide collar 40 may include a plurality of walls 44, 45, 46, and 47 which are contact the walls of the lower tubular handle section 50. For example these walls 44, 45, 46, and 47 contact and ride along support surfaces 57 and 59 discussed above. These support surfaces 57 and 59 extend along the lower tubular handle section 50 to be engaged with the guide collar 40 when the tubular member 24 is adjusted between the fully retracted position, the carry position, and up to just the fully extended position. During relative movement of the upper and lower tubular handle section 50, the engagement of the support surfaces 57 and 59, shown for example in Fig. 4B, form an alignment mechanism which keeps the guide collar 40, and thus the tubular member 24, from rotating relative to the lower tubular handle section 50 and allows smooth sliding of both.

**[0040]** The engagement mechanism noted above may be utilized to secure the tubular member 24 in a position relative to the lower tubular handle section 50 by causing the engagement member 26 to be received in the first, second, or third aperture 52a, 52b, or 52c formed at desired positions along the lower tubular handle section 50. The engagement mechanism 21 may selectively engage any additional aperture along the longitudinal length. In accordance with various embodiments, the engagement member 26 may directly engage the apertures 52a, 52b, or 52c. Alternatively, the engagement member 26 may not directly engage the apertures 52a, 52b, or 52c. For example, one or more of the apertures 52a, 52b, or 52c may support an engagement member receiver 60. Each aperture may engage with a receiver 60. The receiver 60 may be a plastic (or other material) tab that snaps into each of the apertures. The receiver 60 may have a recess that is sized to match the engagement member 26.

**[0041]** The integration of the various components of the luggage case 5 may allow for reduced costs associated with assembly, as well as weight savings, as well as enhanced strength and durability. The integration of the lower tubular handle section 50 is an example of this. Also the grip portion 22 with the tubular member 24 may be integrated, or the tubular member 24 with the guide collar. In one example, the grip portion 22 and tubular member 24 may be fabricated in such a way as to allow the button 27 and related mechanisms 21, such as a wire or linkage 29, to be received within the handgrip and tu-

bular member 24 and still be allowed to operate as necessary to actuate the engagement mechanism as noted above.

**[0042]** The grip portion and tubular member 24 may be formed continuously or separately. They may be formed of a fiber reinforced plastic as this material may provide sufficient strength and stiffness. Also, since carbon fibers are lighter than aluminum, the total weight of the handle assembly 20 may be lighter than the total weight of a conventional plastic grip portion 22 and the aluminum tubular member 24. However, in various other examples, the grip portion 22 may be formed of another material, such as metal, reinforced plastic, plastic, wood, or other materials having sufficient strength and stiffness. The tubular member 24 may or may not be formed of the same material, and may be a separate member suitably attached to the grip portion 22. In various examples, a thermoplastic reinforced with carbon fibers may be used to integrally fabricate the grip portion 22 and the tubular member 24. The thermoplastic may be a single plastic such as polyamide or a polymer blend. The thermoplastic is a matrix that embeds the continuous carbon fibers to provide the composite with impact resistance or toughness. The method includes laying up the carbon fibers, and molding the thermoplastic with the carbon fibers to form an integrated composite component. With any of a variety of material that may be used to form the various components, any of a variety of manufacturing processes may be used as well. For example, manufacturing may include injection molding or compression molding, among other processes.

**[0043]** In accordance with various embodiments, the luggage case 5 may be manufactured through injection molding process utilizing any known appropriate materials. As shown in Fig. 5A, an injection molding tool 100 may be utilized to form the luggage case 5. The injection-moulding tool may include a top tool portion 70, a bottom tool portion 80, and a slide tool portion 90. The top tool portion 70 and the bottom tool portion 80 may mate together leaving a gap that forms the plurality of panels that define the luggage case 5. The slide tool portion 90 may be inserted within the top tool portion 80 and the bottom tool portion 90 to form the lower tubular handle section 50 integrally into rear panel 12 of the luggage case 5. The gap between tool 70 and slide 90 may define the walls of the lower tubular handle section 50. The tool 70 and the slide 90 may contact at a plurality of points 92 forming apertures through the lower tubular handle section 50. For example, aperture 52 may be formed by contacting tool 70 with slide 90. Slide 90 may have an engagement lock 94 that also engages tool 70 forming an end aperture 58 in the lower tubular handle section 50. The engagement lock 94 between the tools may improve the consistency of the formation of the lower tubular handle section during the injection molding process.

**[0044]** The handle assembly 20, including an integrally formed lower handle section and a slidable handle section, provides a luggage case that includes fewer parts

than typical luggage cases. The integrally moulded tube of the handle provides dual function replacing the usual outer tube of a typical pull handle arrangement. In addition by using integrally moulded part as the outer tube of the handle assembly (i.e. receives the sliding tube in its interior), it is lighter and avoids need for an additional tube (e.g. and aluminium tube attached to the shell), which is more costly than the integrally moulded lower handle section (e.g. which can be part of the plastic injection moulding of the shell). This arrangement reduces parts costs and simplifies manufacturing further reducing costs to construct the luggage case. The handle assembly 20 also includes features which simplify assembly. For example, snap-fit features which allow simple engagement between movable components, and/or the integrally formed lower handle section for replacing that portion of a typical extendable handle. This hybrid use of integral (e.g. snap-fit features, and the lower tube of the extendable handle being molded into the luggage case) and non-integral parts (e.g. the telescoping portion of the extendable handle), for example, reduces the number of parts to assemble the luggage case. As the integral handle section is contiguous with the luggage case shell, the integral form provides better visual appearance. As the lower handle section is integrally formed it is able to provide better protection of the other movable handle tubes since they are not exposed to the interior of the luggage case and are not reliant on fasteners or brackets to attach them to the luggage case.

**[0045]** Intermediate components between the integral handle section and the slidable handle section, such as the top bracket insert, also improve the performance of the luggage case. For example, the top bracket insert may provide stiffness to prevent bending and local reinforcement which may make the handle assembly more robust during heavy usage of the luggage case by a user.

**[0046]** Having described several embodiments herein, it will be recognized by those skilled in the art that various modifications, alternative constructions, and equivalents may be used. The various examples and embodiments may be employed separately or they may be mixed and match in combination to form any iteration of the alternatives. Additionally, a number of well-known processes and elements have not been described in order to avoid unnecessarily obscuring the present invention. Accordingly, the above description should not be taken as not limiting the scope of the invention.

**[0047]** Those skilled in the art will appreciate that the presently disclosed embodiments teach by way of example and not by limitation. Therefore, the matter contained in the above description or shown in the accompanying drawings should be interpreted as illustrative and not in a limiting sense. The following claims are intended to cover all generic and specific features described herein, as well as all statements of the scope of the present method and system, which, as a matter of language, might be said to fall there between.

## Claims

1. A luggage case (5) comprising a moulded shell (6, 7) and a handle assembly (20), the moulded shell having a back panel (12), a top panel (14), and the handle assembly (20), comprising (5):
  - a lower tubular handle section (50) extending at least a portion of the length of the back panel (12);
  - a sliding handle section (24, 40) formed of at least one tubular member (24) telescopically received within the lower tubular handle section (50) and configured to extend from the lower tubular handle section (50);
  - a grip portion (22) positioned adjacent an upper end of the sliding handle section (24, 40); and
  - a releasable engagement mechanism (21) operable to selectively position the sliding handle section (24, 40) along the length of the lower tubular handle section (50);

**characterized in that** the lower tubular handle section (50) is integrally formed with the back panel (12) of the moulded shell and comprises a tubular recess moulded with the back panel (12).
2. The luggage case of claim 1, further comprising:
  - a top bracket insert (30) received in an upper first end portion of the lower tubular handle section (50) proximate the exterior of the luggage case (5); and
  - the top bracket insert (30) receiving the tubular member (24) such that the top bracket insert (30) guides the tubular member (24) relative to the lower tubular handle section (50).
3. The luggage case of claim 2, wherein the top bracket insert (30) further comprises first protrusion (36a) for engaging a first aperture (54a) to secure the top bracket insert (30) within the lower tubular handle section (50).
4. The luggage case of claim 3, wherein the top bracket insert (30) further comprises a second protrusion (36b) for engaging a second aperture (54b) within the lower tubular handle section (30) aligning the top bracket insert (30) within the lower tubular handle section (50).
5. The luggage case of claim 4, wherein the first protrusion (36a) is larger than the second protrusion (36b), with the second protrusion (36b) being distal to the grip portion (22) relative to the first protrusion (36).
6. The luggage case according to any one of the preceding claims, further comprising a guide collar (40) received onto an end of the tubular member (24) opposite the grip portion (22).
7. The luggage case of claim 6, wherein the guide collar (40) contacts the interior of the lower tubular handle section (50) such that the guide collar (40) is operable as a slidable bushing between the interior of the lower tubular handle section (50) and the exterior of the tubular member (24).
8. The luggage case of claim 6, wherein:
  - the releasable engagement mechanism (21) includes a movable locking pin (26) that extends from the guide collar (40) toward the lower tubular handle section (50);
  - one or more apertures (52) formed through a sidewall of the lower tubular handle section (50) and into the interior of the luggage case (5);
  - wherein the releasable engagement mechanism includes an actuator (27) located within the grip portion (22) and the locking pin (26) being in mechanical communication with the actuator (27) such that in response to actuation of the actuator (27) the locking pin (26) is positioned to move past each of the one or more apertures (52) without engaging.
9. The luggage case of claim 8, wherein the locking pin (26) is biased to automatically extend into at least one of the plurality of apertures (52) when aligned therewith, and thereby selectively securing the extension of the sliding handle assembly from the lower tubular handle section (50).
10. The luggage case according to any one of the preceding claims, wherein the moulded shell and lower tubular handle section (50) are integrally formed in the luggage case by injection molding.
11. The luggage case according to any one of the preceding claims, wherein the lower tubular handle section (50) is a longitudinal tubular structure positioned along the back panel (12) and defined by a plurality of walls, with one of the plurality of walls being a common wall with the back panel (12) of the luggage case.
12. The luggage case according to any one of the preceding claims, wherein the integrally formed lower tubular handle section (50) receives substantially the full length of the tubular member (24).
13. The luggage case according to any one of the preceding claims, wherein the lower tubular handle section is disposed in internal face of moulded back panel of shell.

14. The luggage case according to any one of the preceding claims, wherein the lower tubular handle section includes one of at least a round or rectangular cross section.

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15. A method of forming a luggage case (10) comprising:

plastic injection molding an integral back panel (12), top panel (14) and lower tube section (50);  
forming a sliding handle section (24) with a grip portion (22) located on a first end of the sliding handle (24);  
receiving the sliding handle section (24) into a top bracket insert (30);  
receiving the sliding handle section (24) into the lower tubular handle section (50), with the guide collar (40) extending into the lower tubular handle section (50) and the grip portion (22) remaining exterior to the lower tubular handle section (50); and  
locking the top bracket insert (30) into an end of the lower tubular handle section (50) proximal to the top panel (14) by engaging a protrusion (36a, 36b) through an aperture (54a, 54b) extending through the lower tubular handle section (50).

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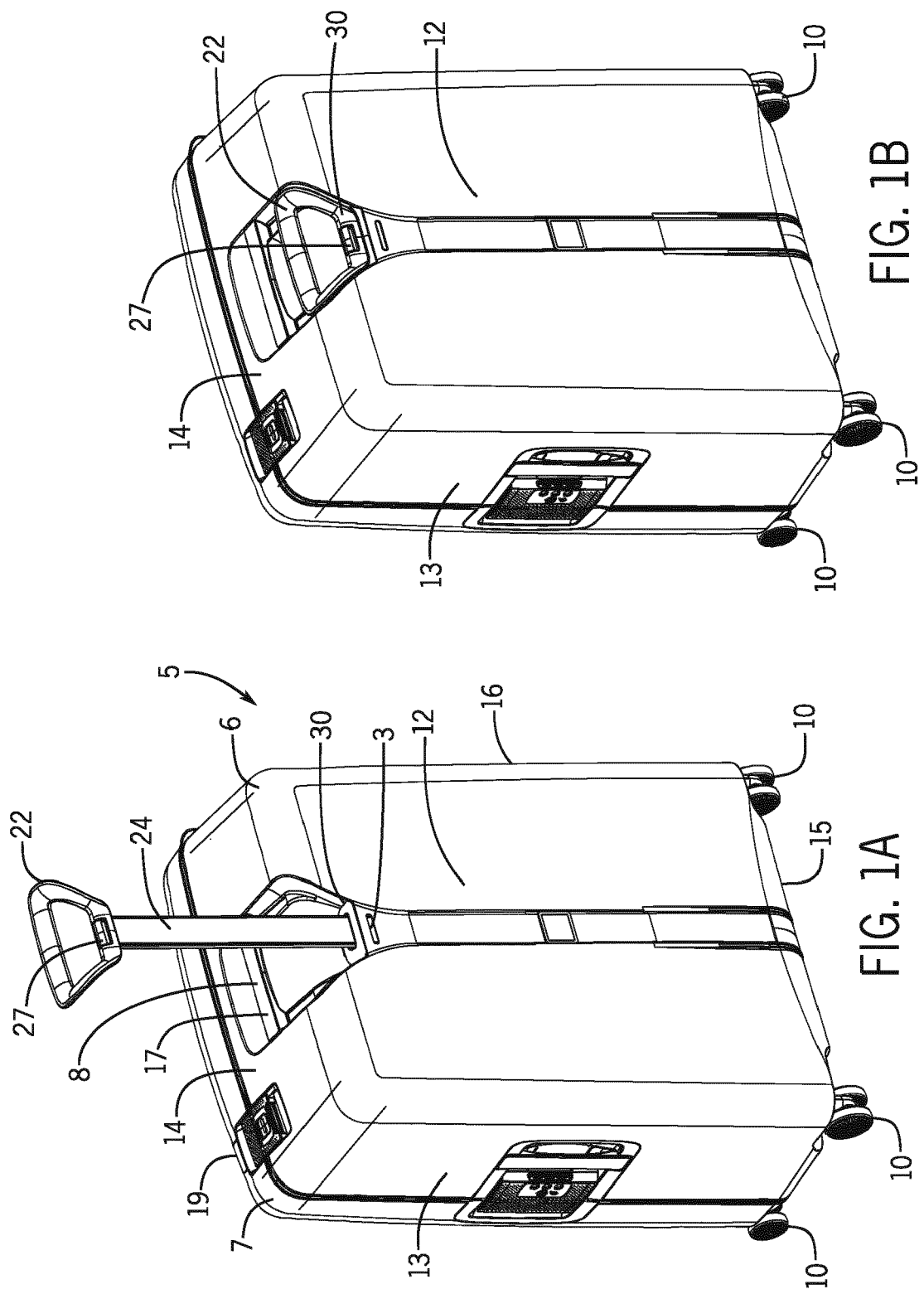
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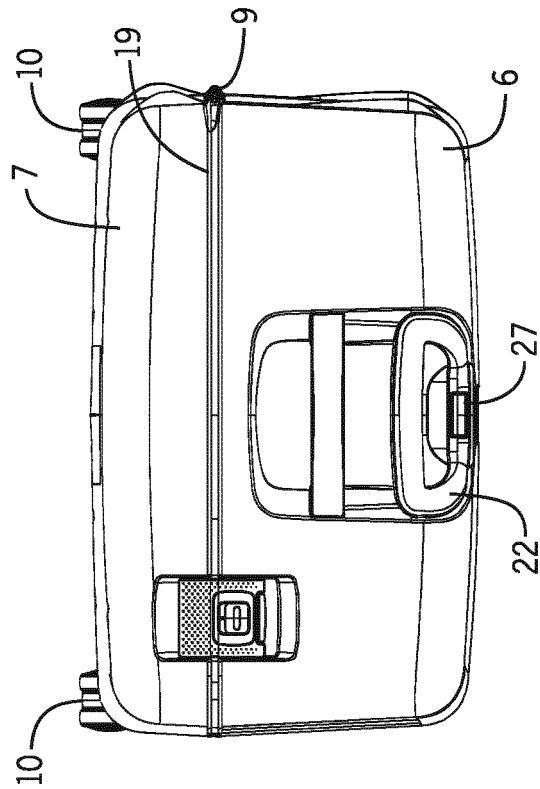
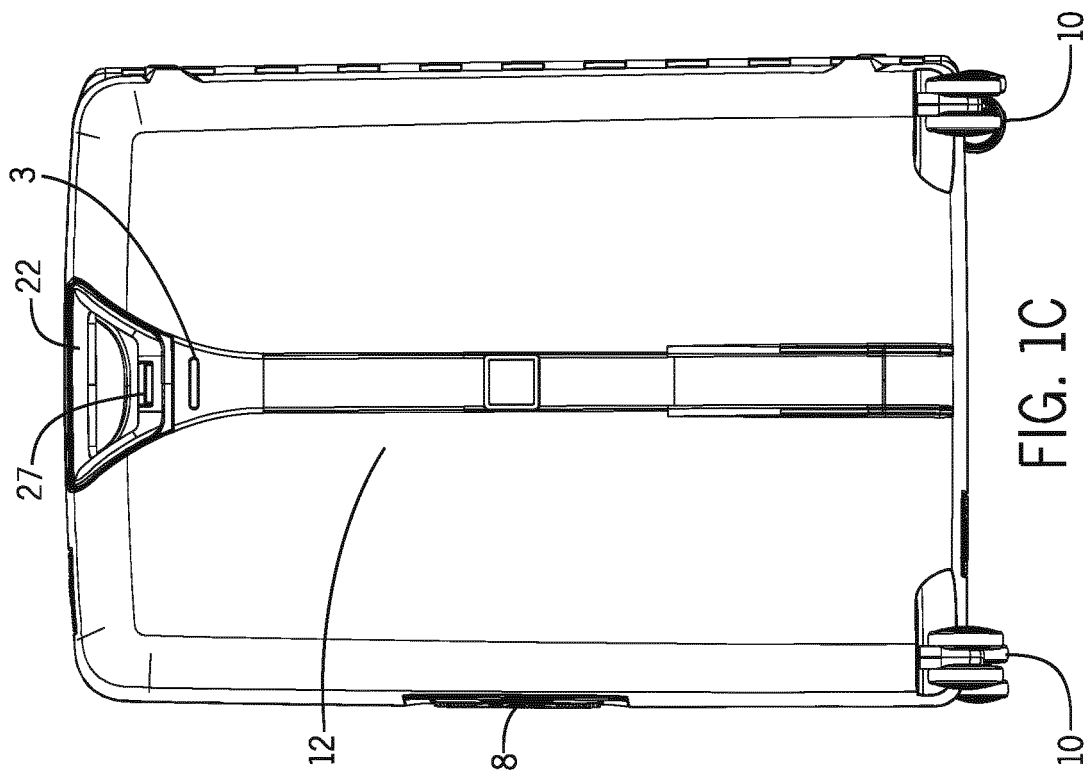


FIG. 1D

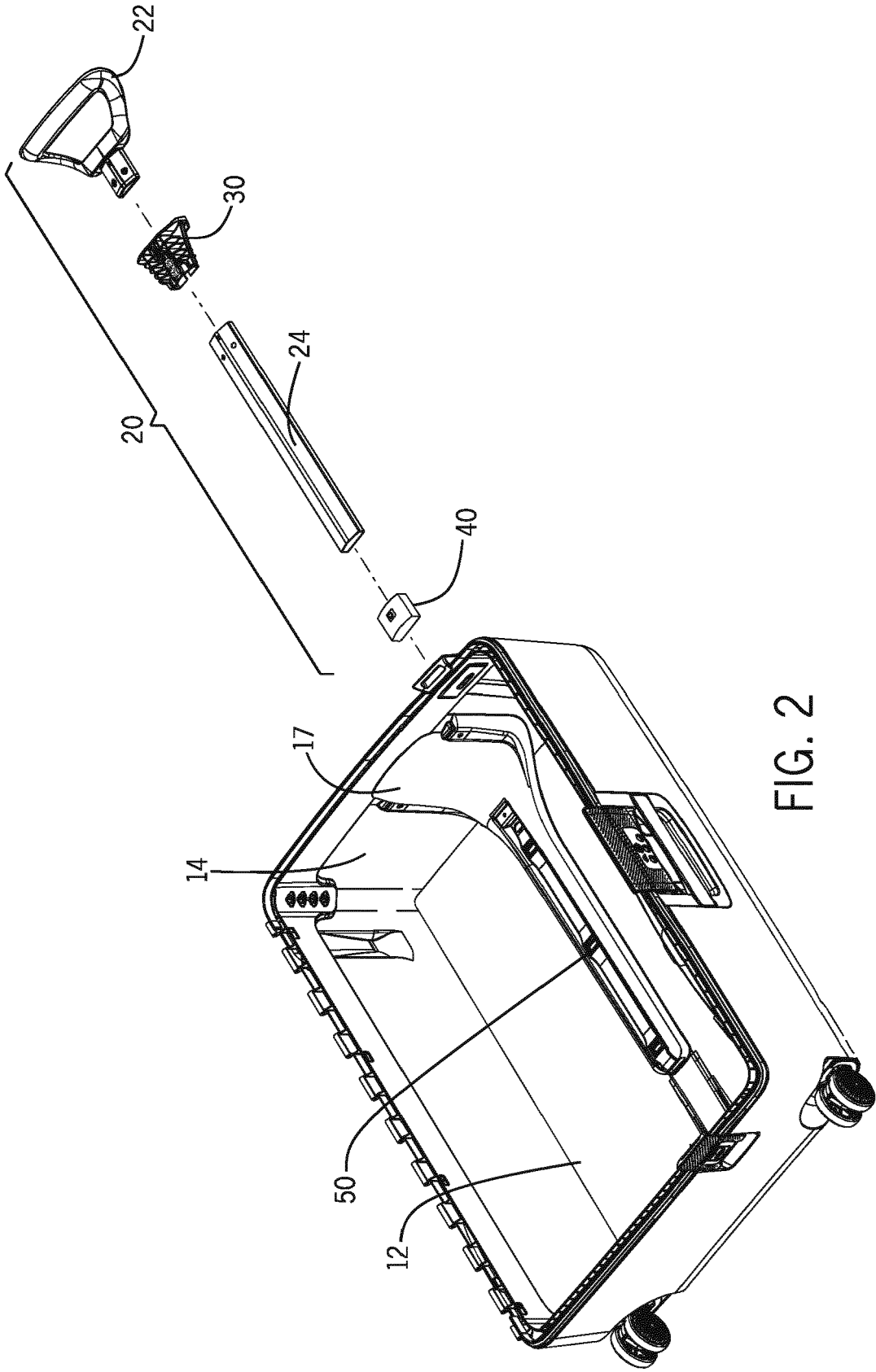
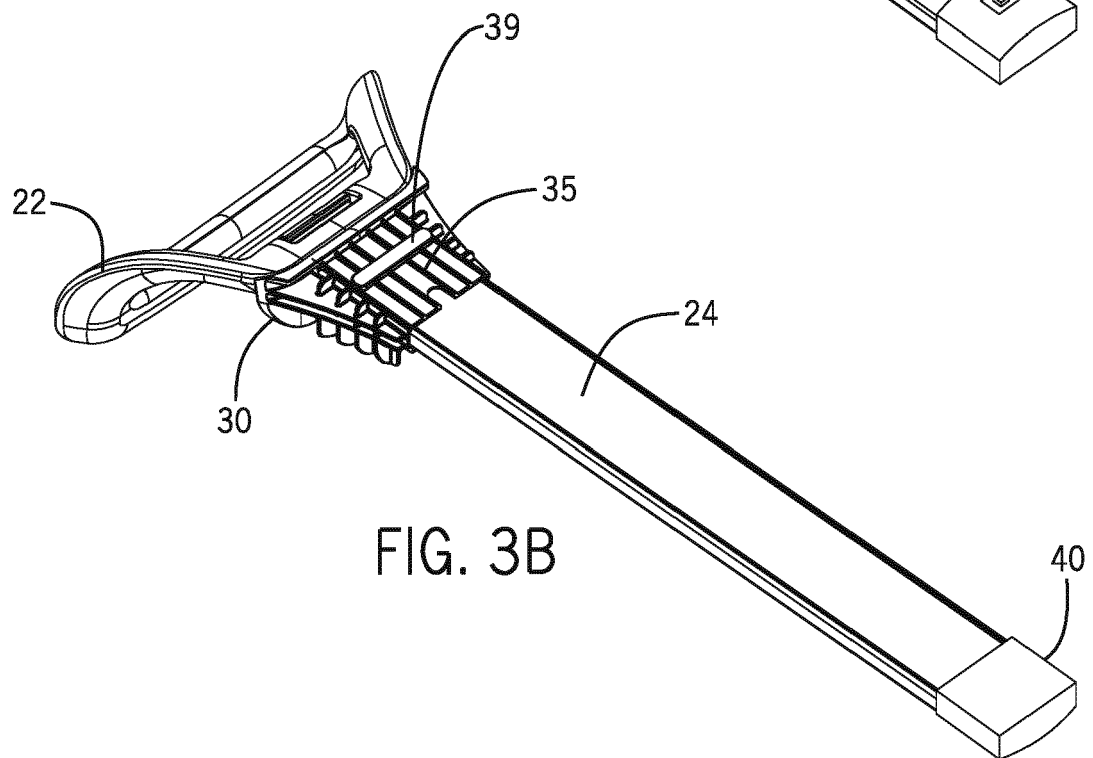
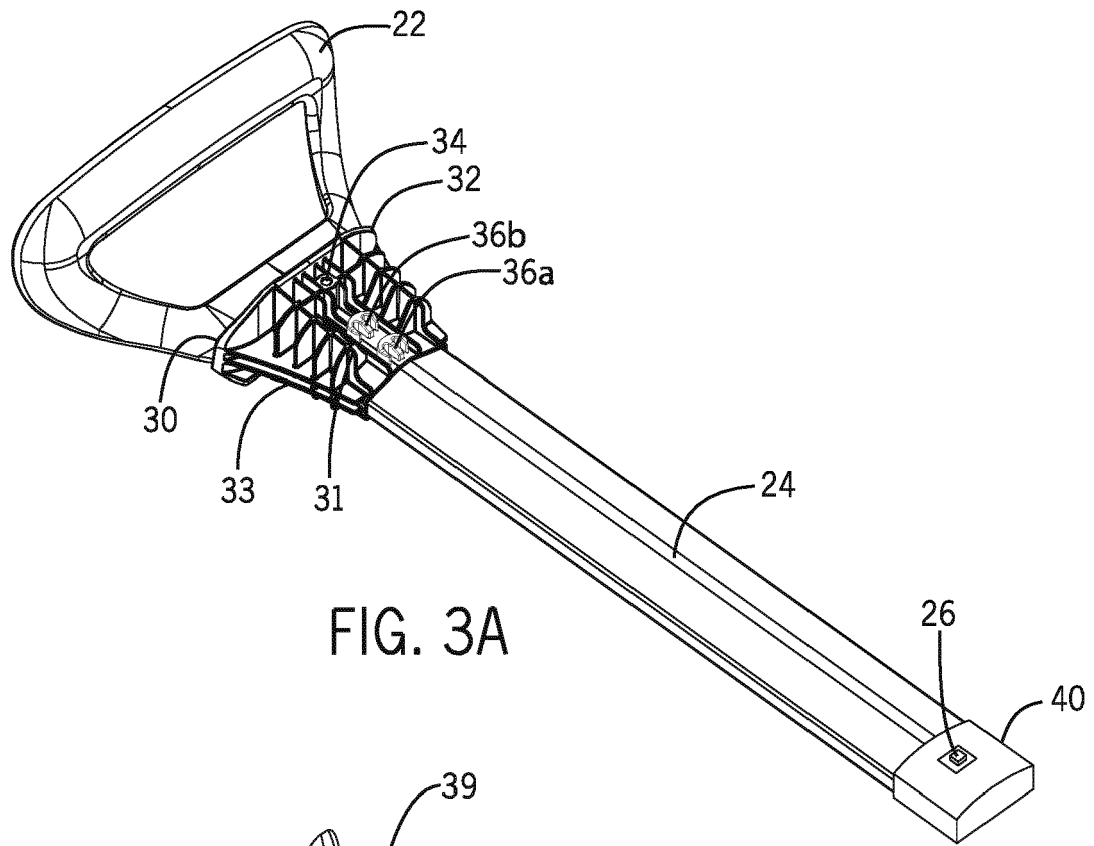


FIG. 2



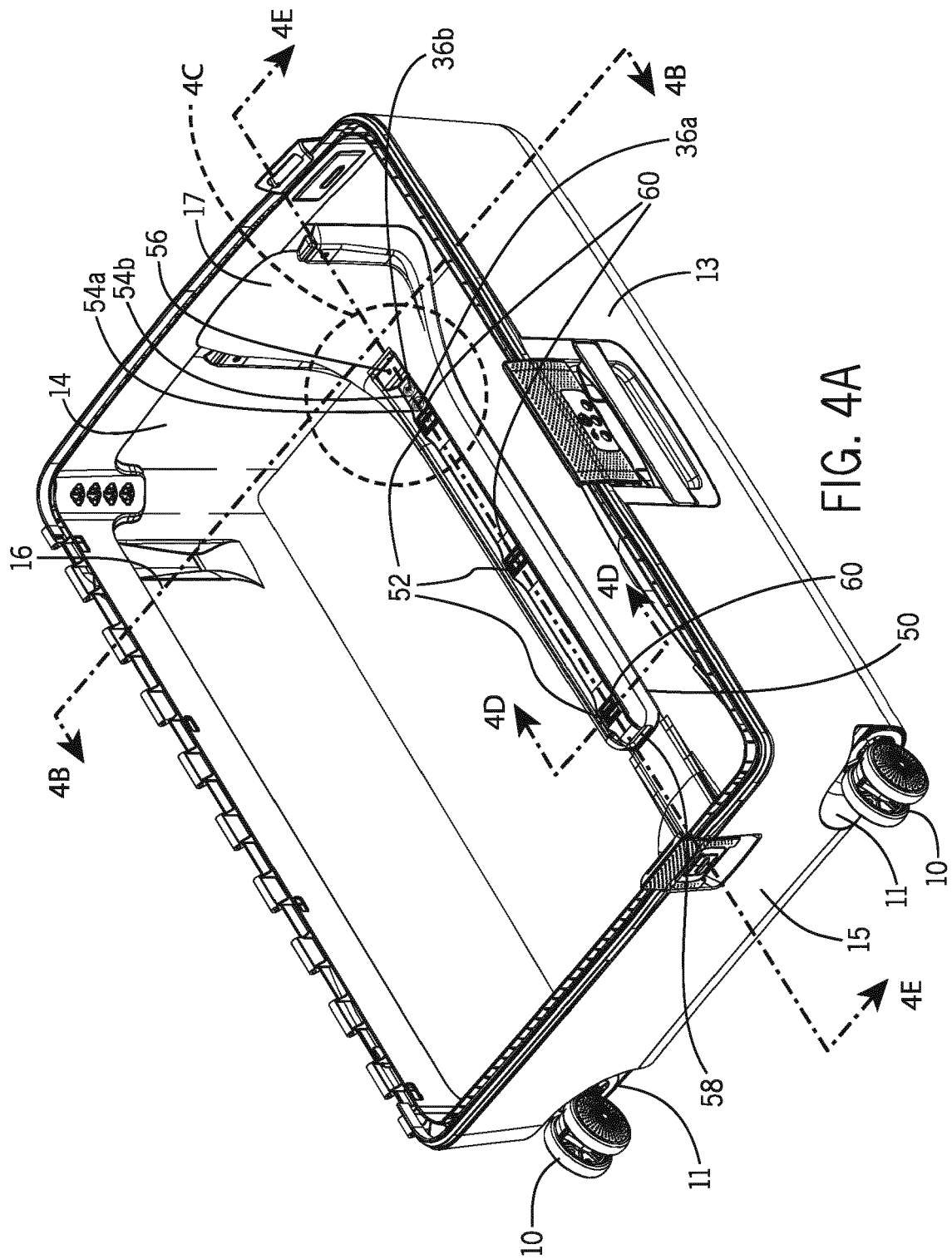


FIG. 4A

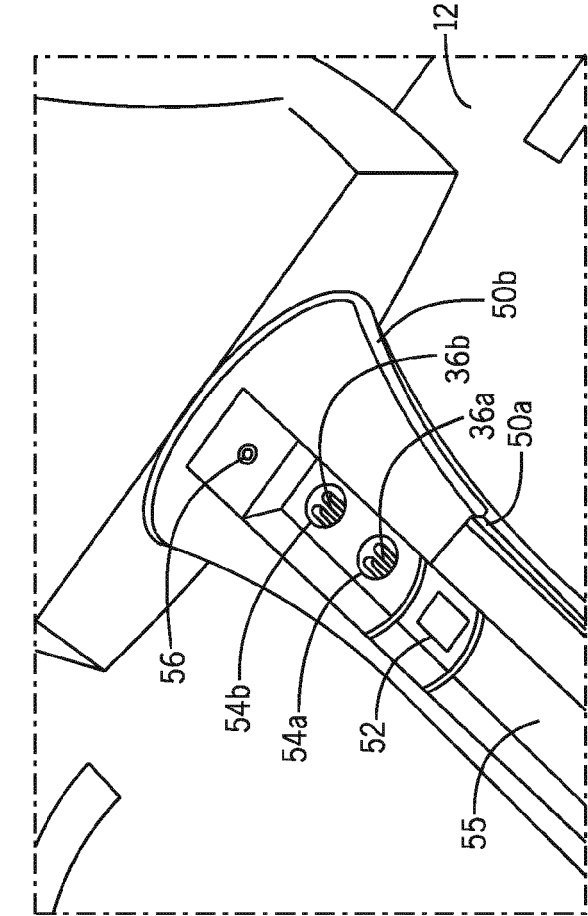


FIG. 4C

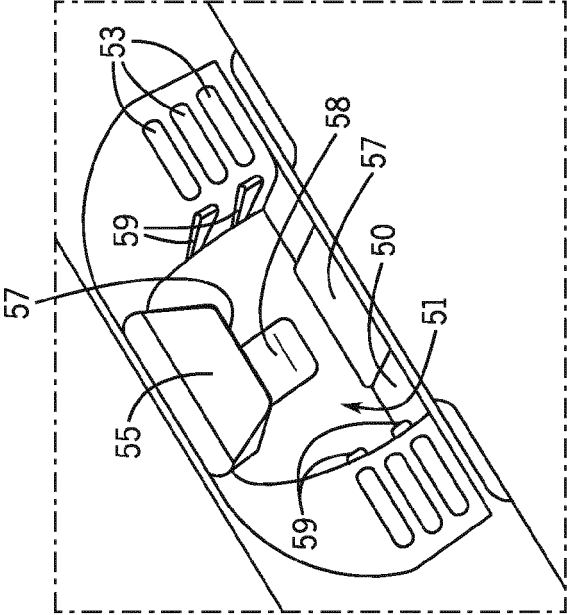


FIG. 4B

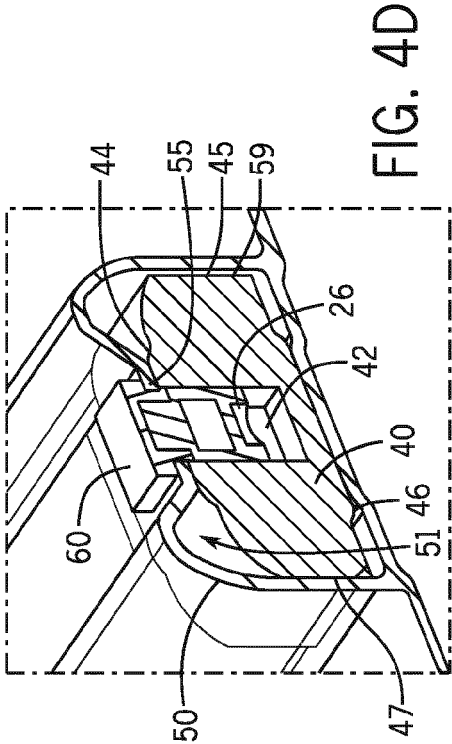


FIG. 4D

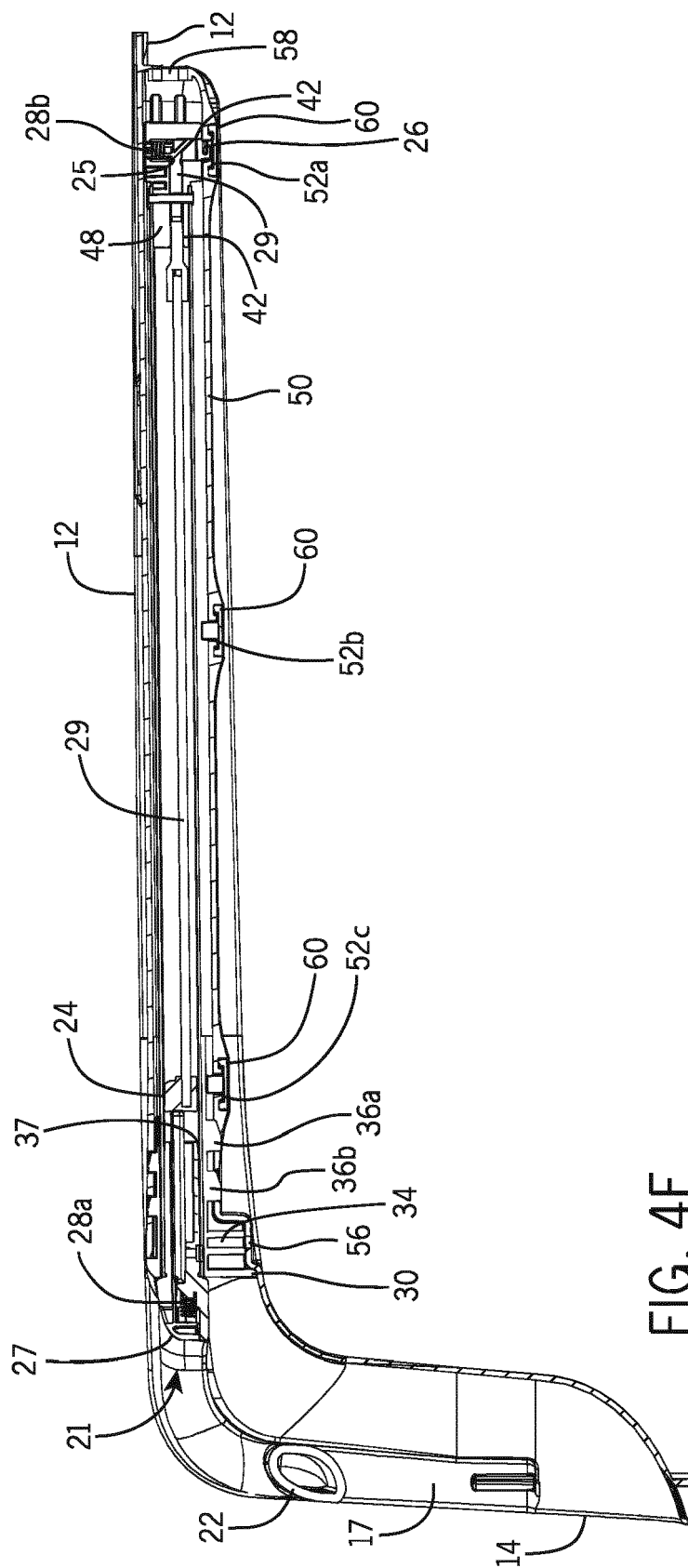


FIG. 4E

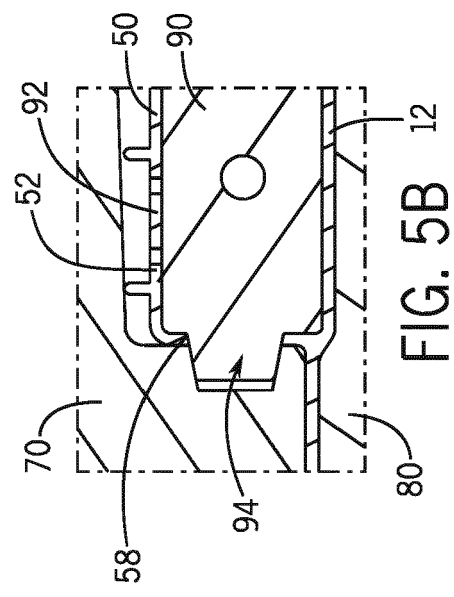
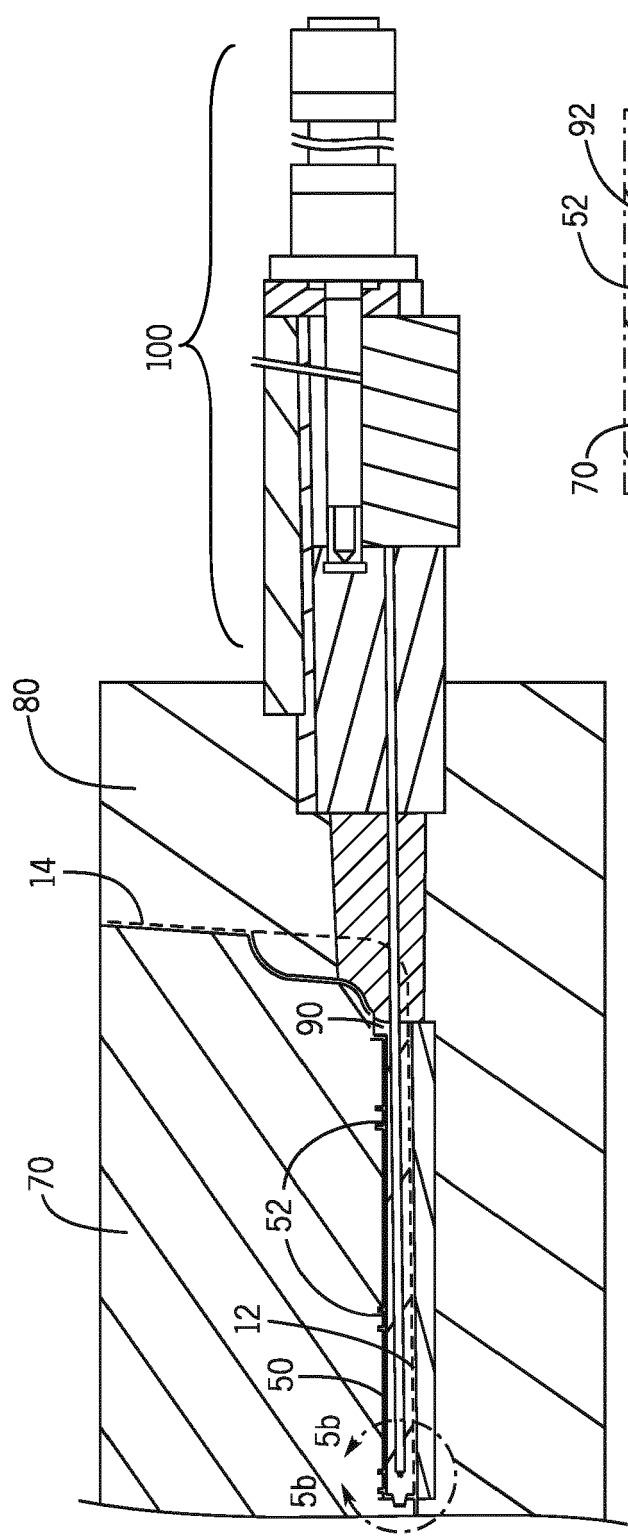


FIG. 5A

FIG. 5B



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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                           |                                                          |                                           |
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| Place of search<br><b>The Hague</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                           | Date of completion of the search<br><b>30 April 2015</b> | Examiner<br><b>Longo dit Operti, T</b>    |
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