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(54) MODULAR REEL ASSEMBLY

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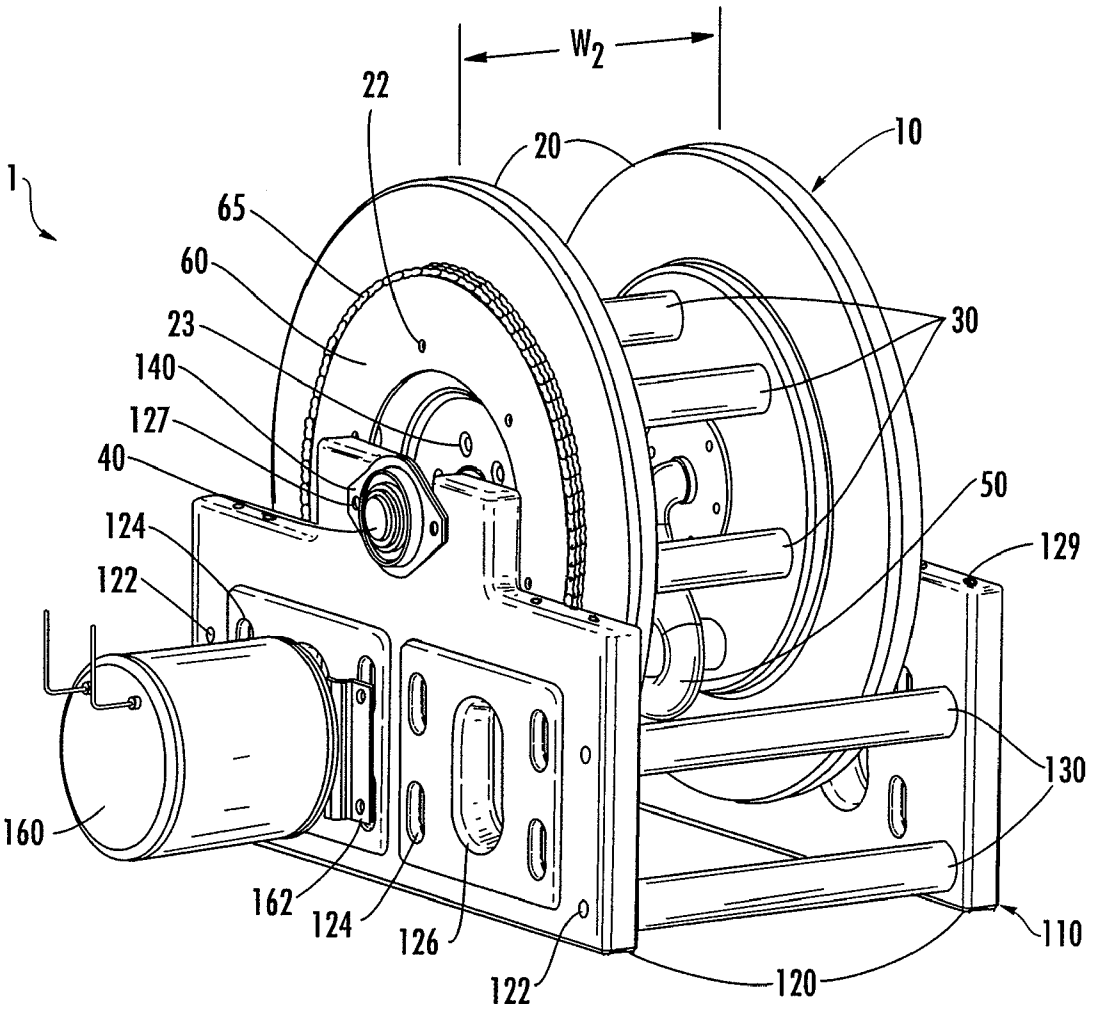
(57) **ABSTRACT**

A modular reel assembly for winding, dispensing, transporting, or storing hose, cord, or cable, is provided. Such a reel comprises of a pair of substantially similar polymeric support endplates and a pair of substantially similar polymeric spool endplates. The substantially similar support endplates are connected by at least one support endplate connecting member defining a predetermined support assembly width. The substantially similar spool endplates are connected by at least one spool endplate connecting member defining a predetermined spool assembly width. The modular reel assembly can thus be adjusted to particular discrete spool assembly and support assembly widths through appropriately selected interchangeable spool endplate and support endplate connecting members.



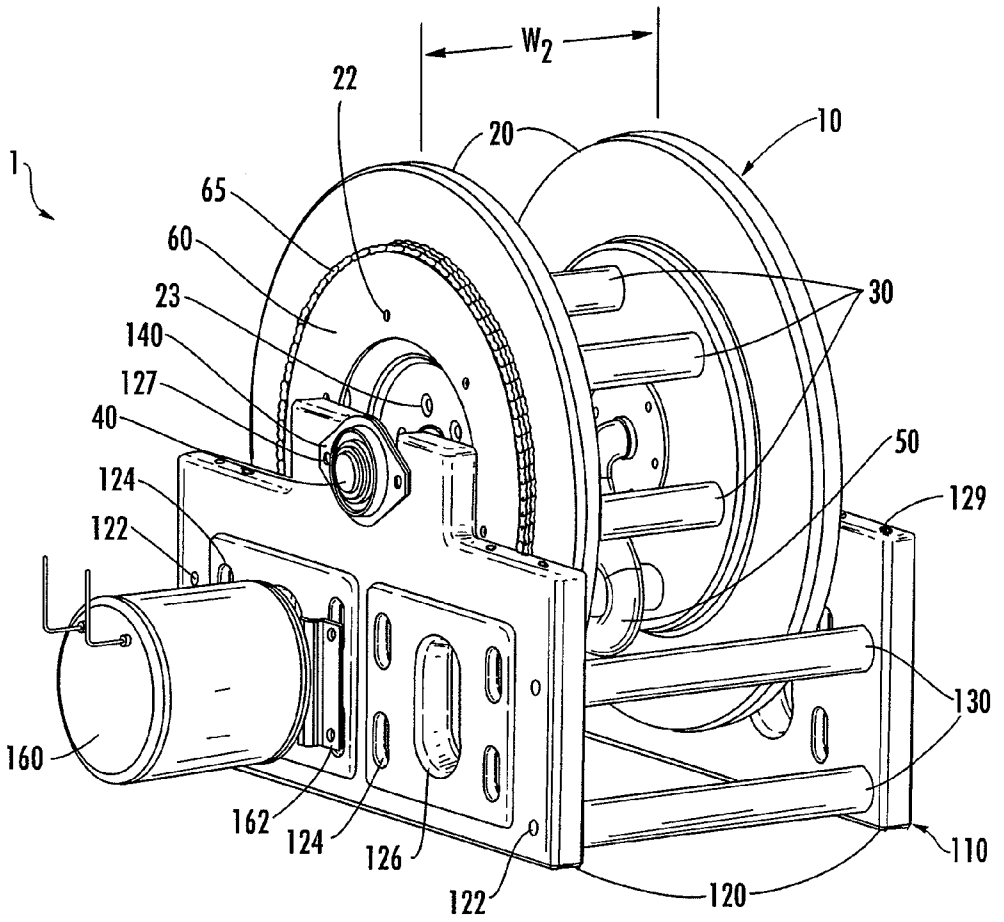

W2
22
20
10
1
65
60
23
140
127
40
124
122
30
50
129
130
160
162
124
126
122
120
110

FIG. 1a

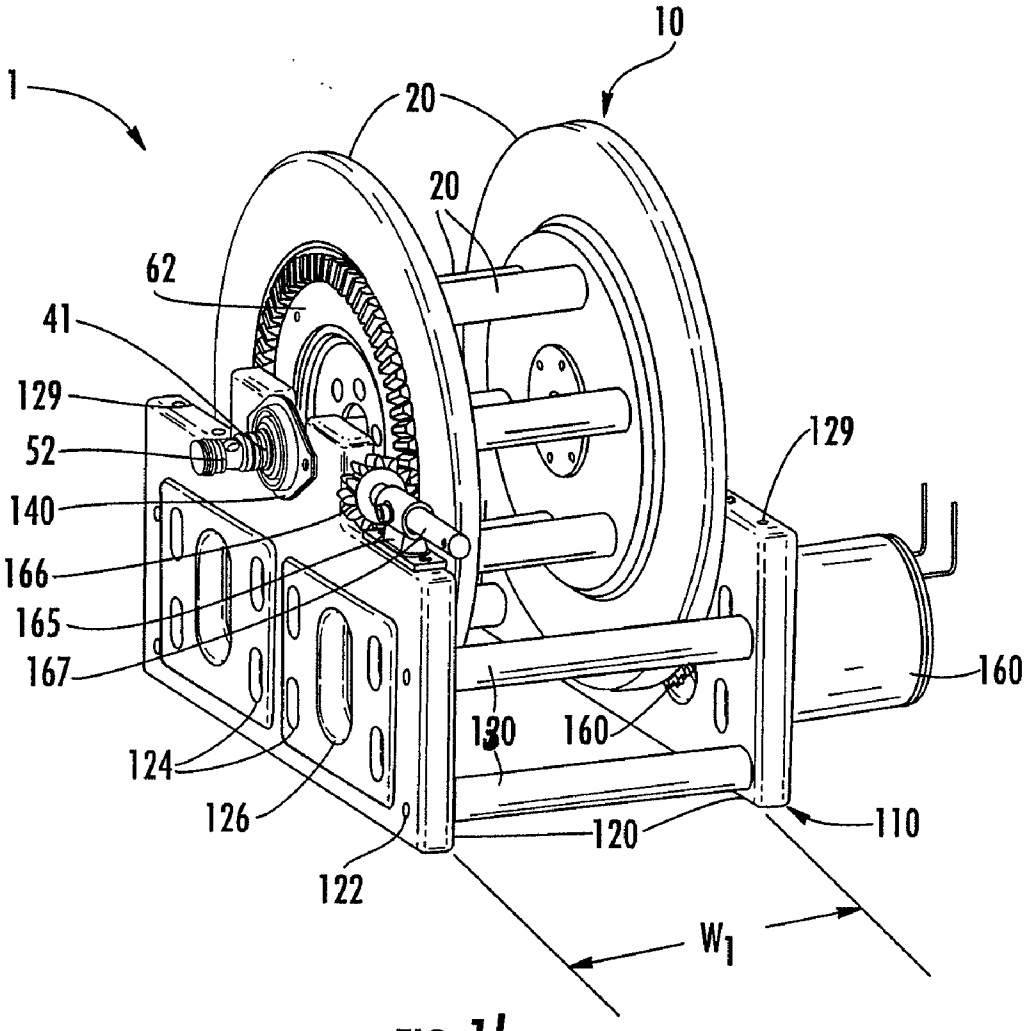

10
1
20
20
62
41
129
52
140
166
165
167
129
160
130
160
124
126
120
110
122
W_1

FIG. 1b

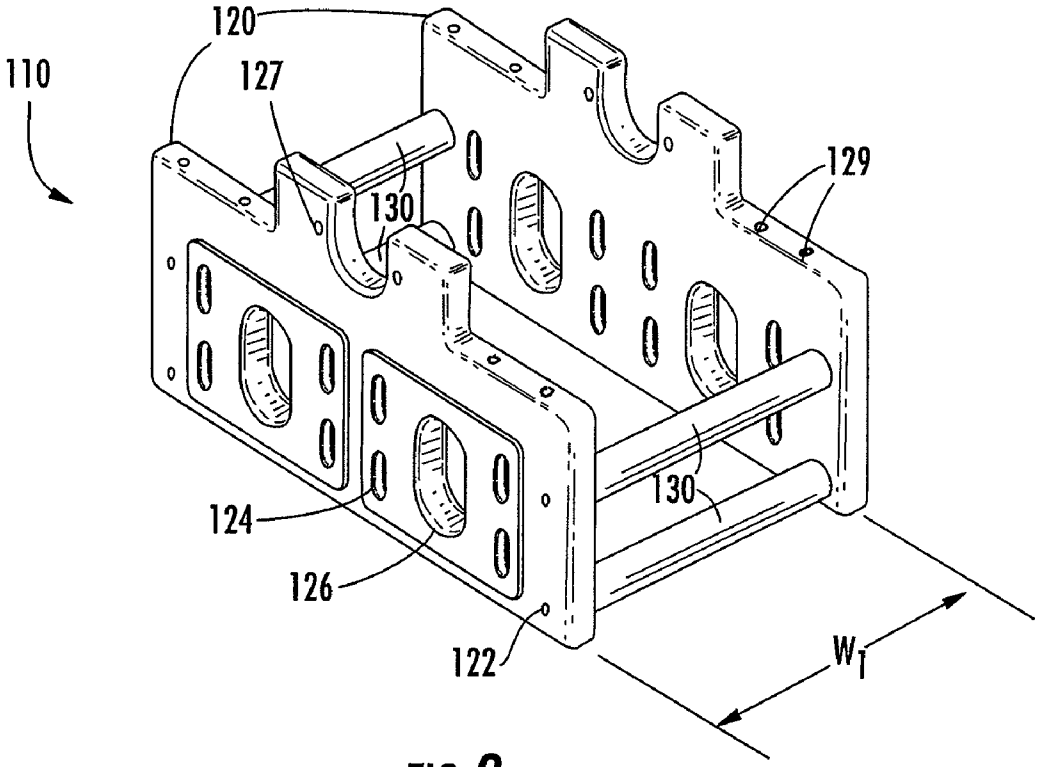


FIG. 2a

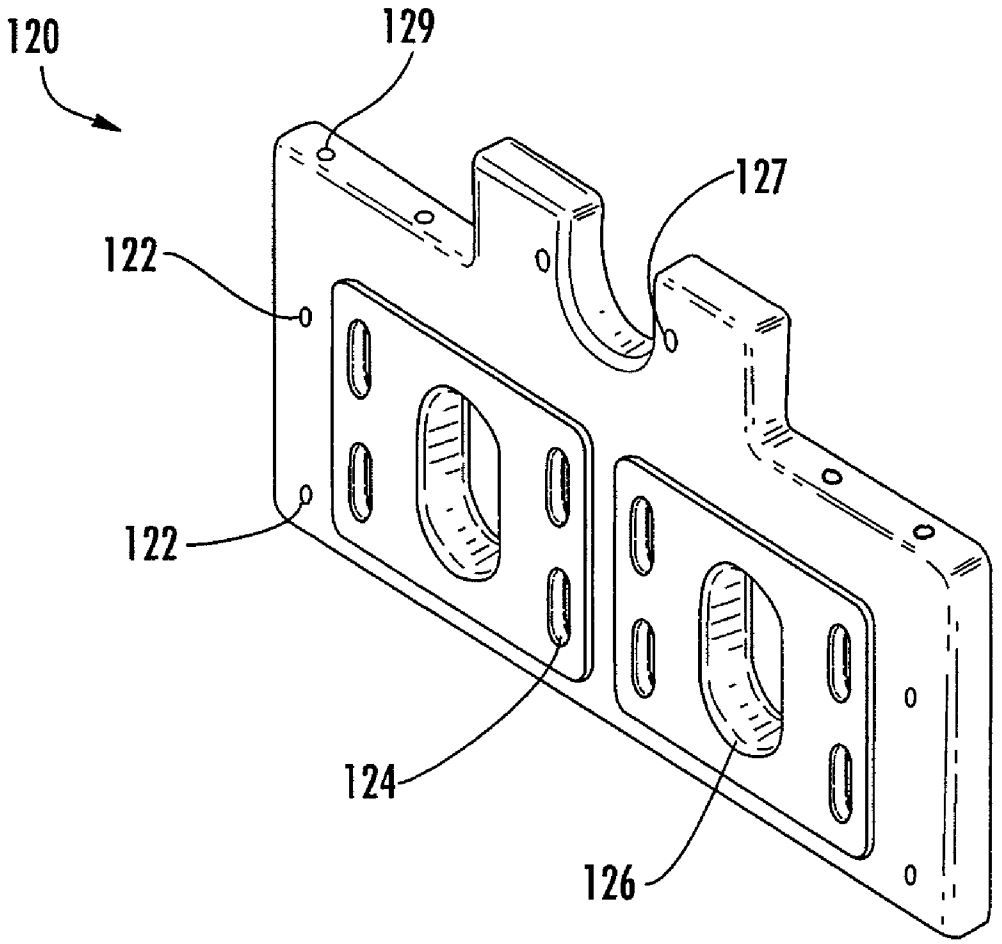


FIG. 2b

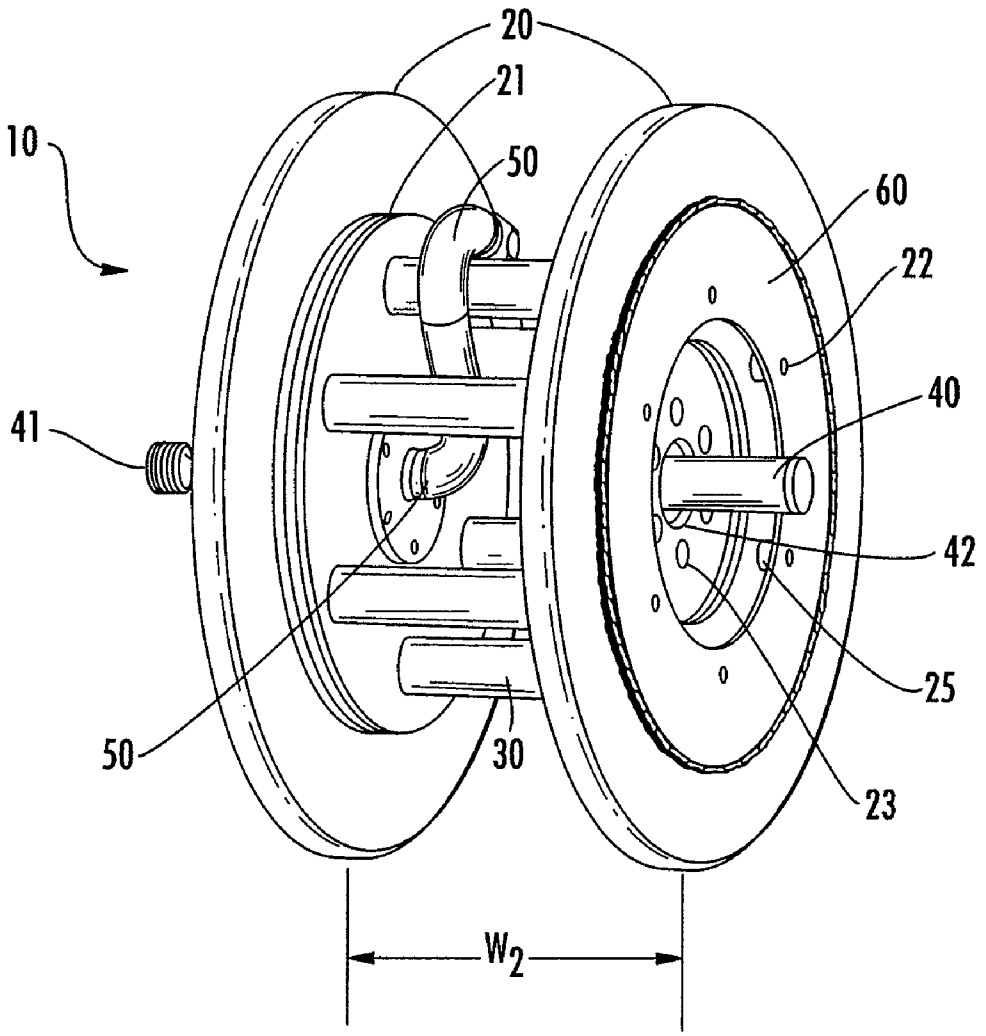


FIG. 3a

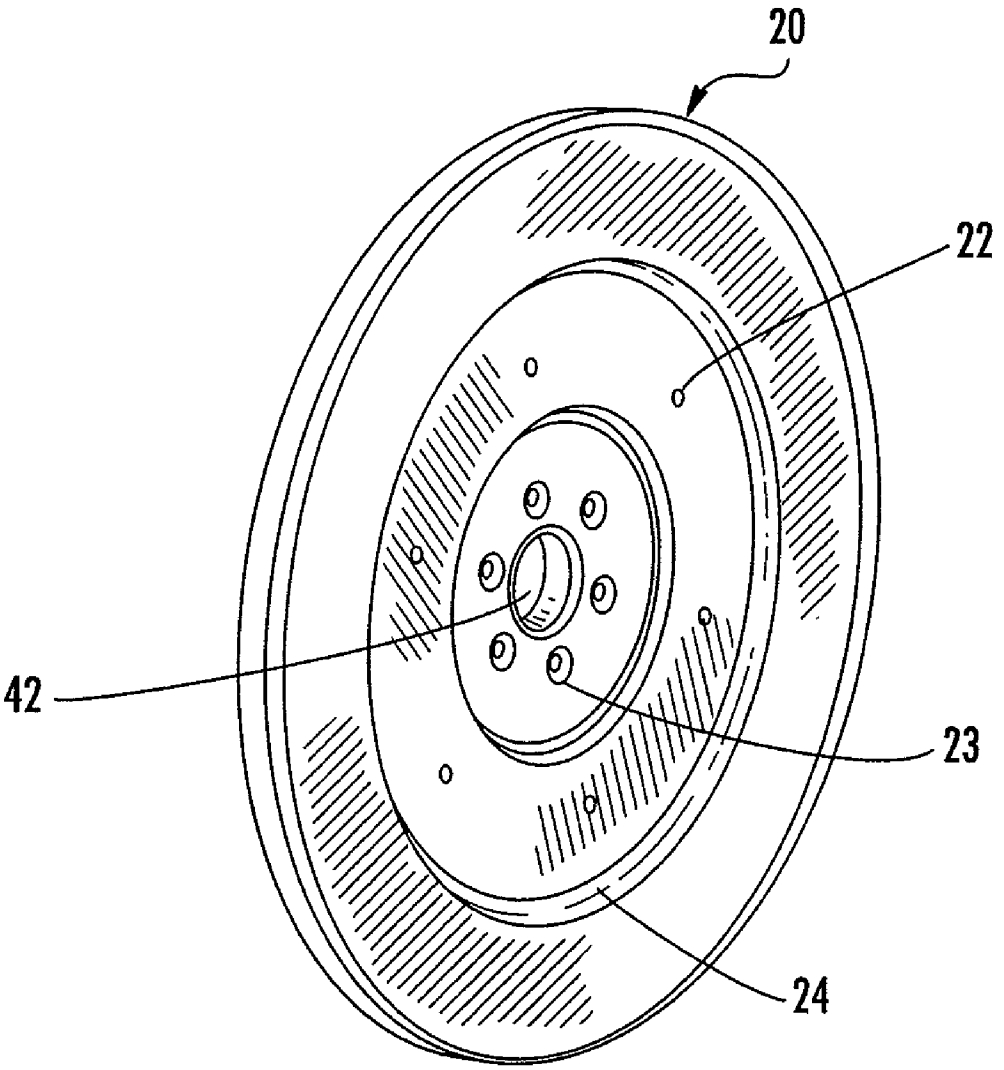


FIG. 3b

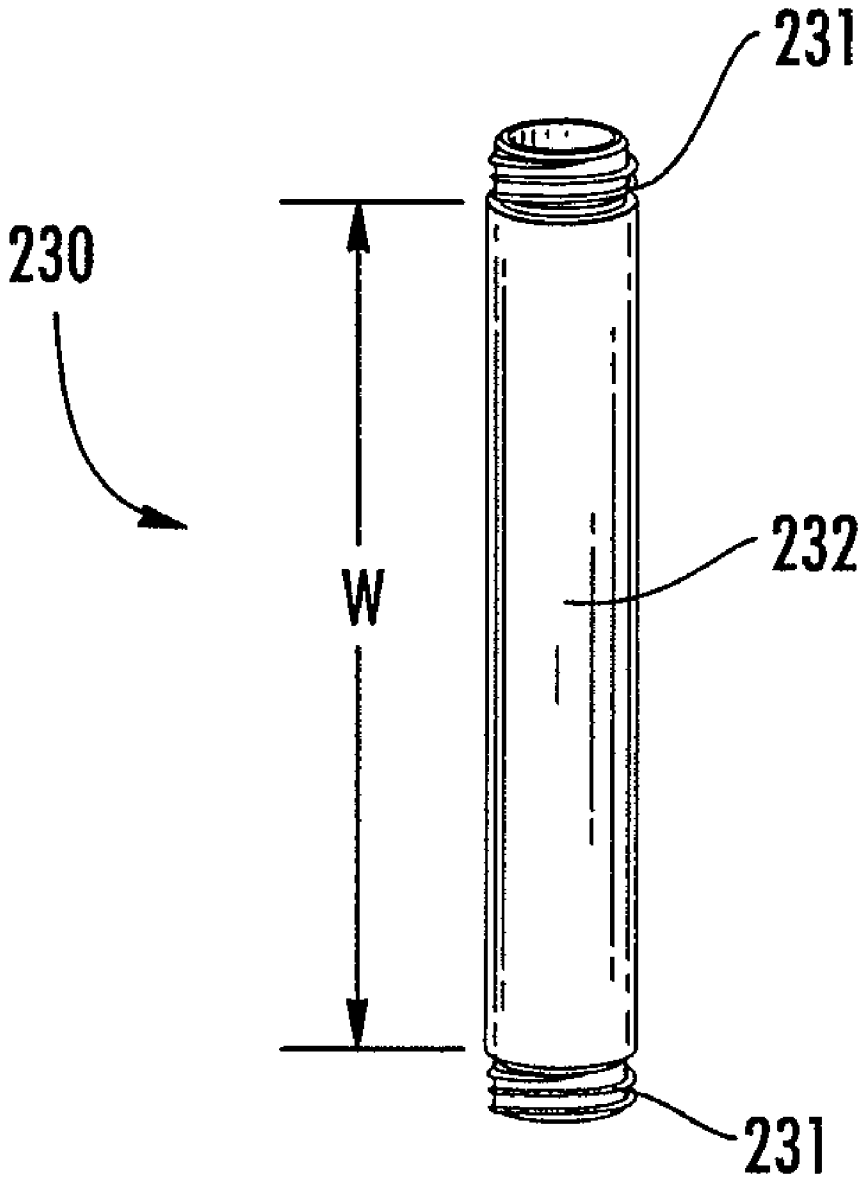


FIG. 4a

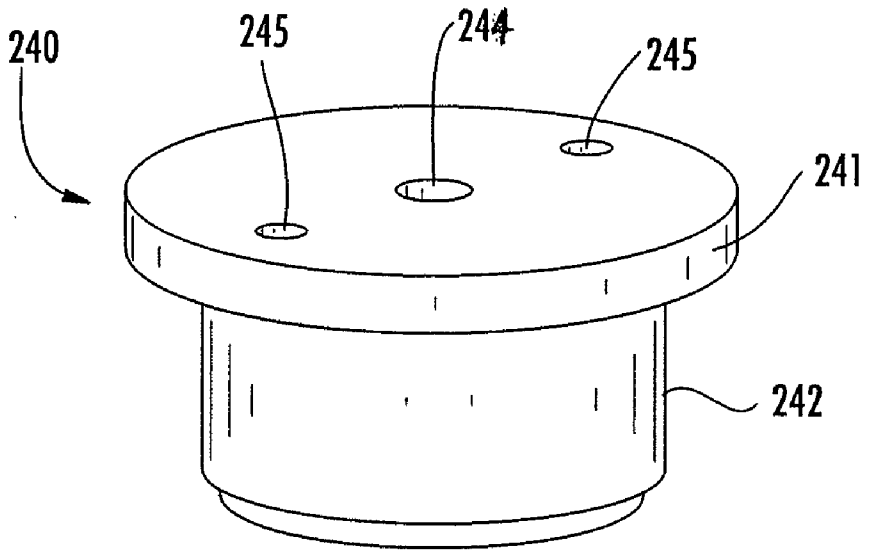


FIG. 4b

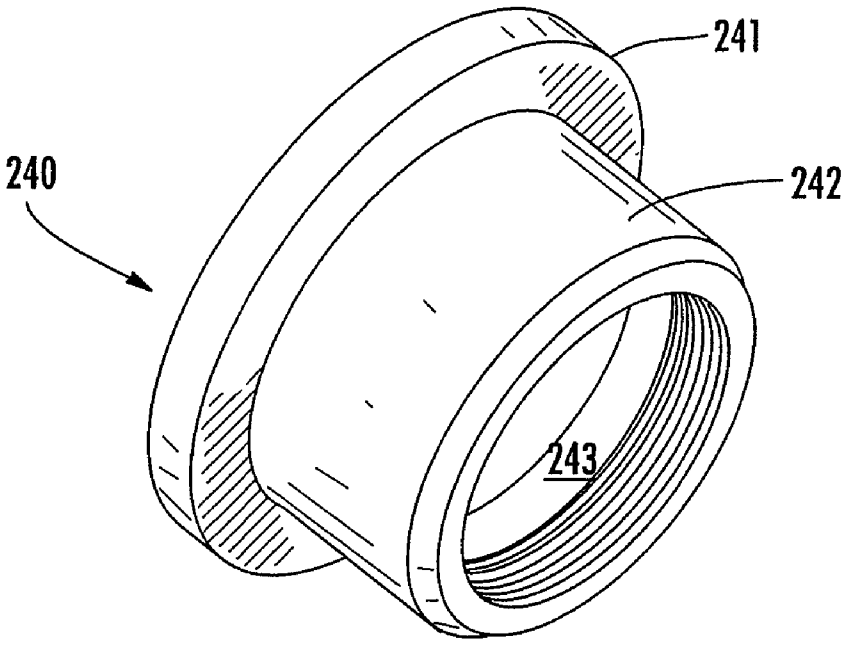


FIG. 4c

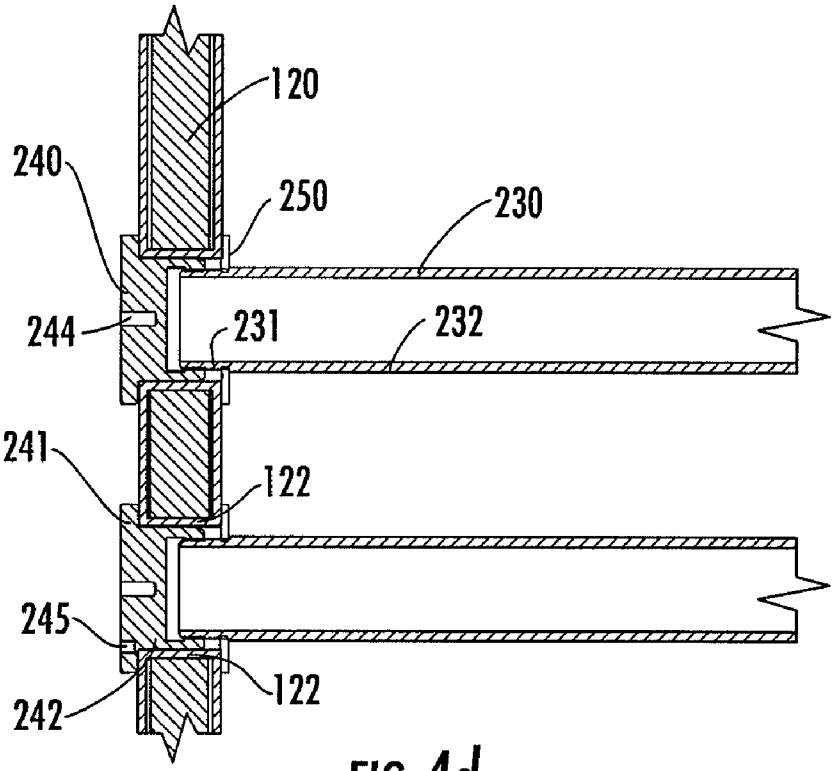

120
240
250
230
244
231
232
241
122
245
122
242

FIG. 4d

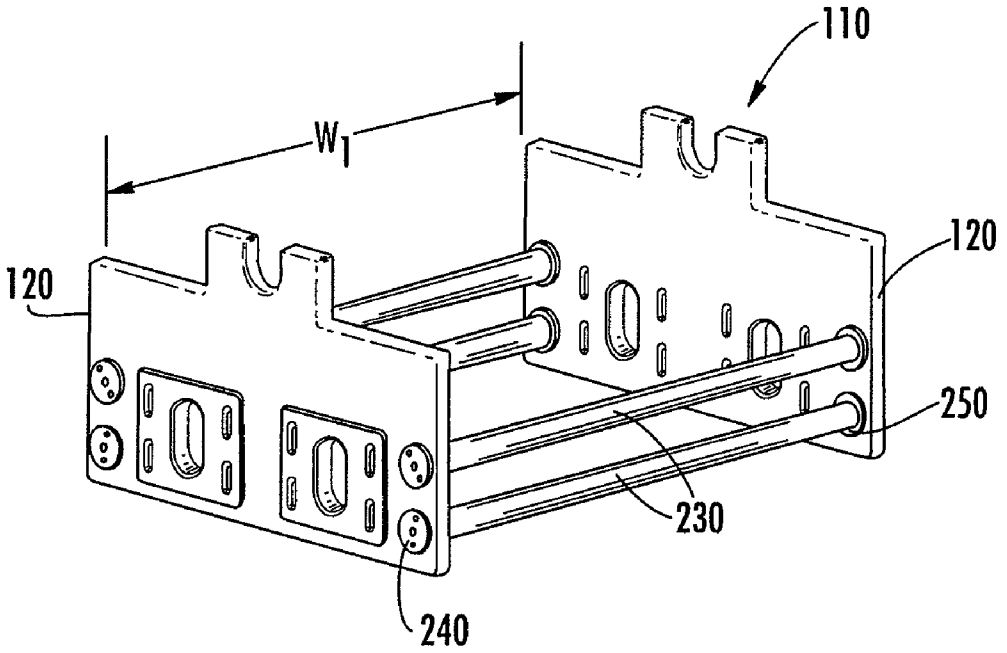

110
W1
120
120
250
230
240

FIG. 4e

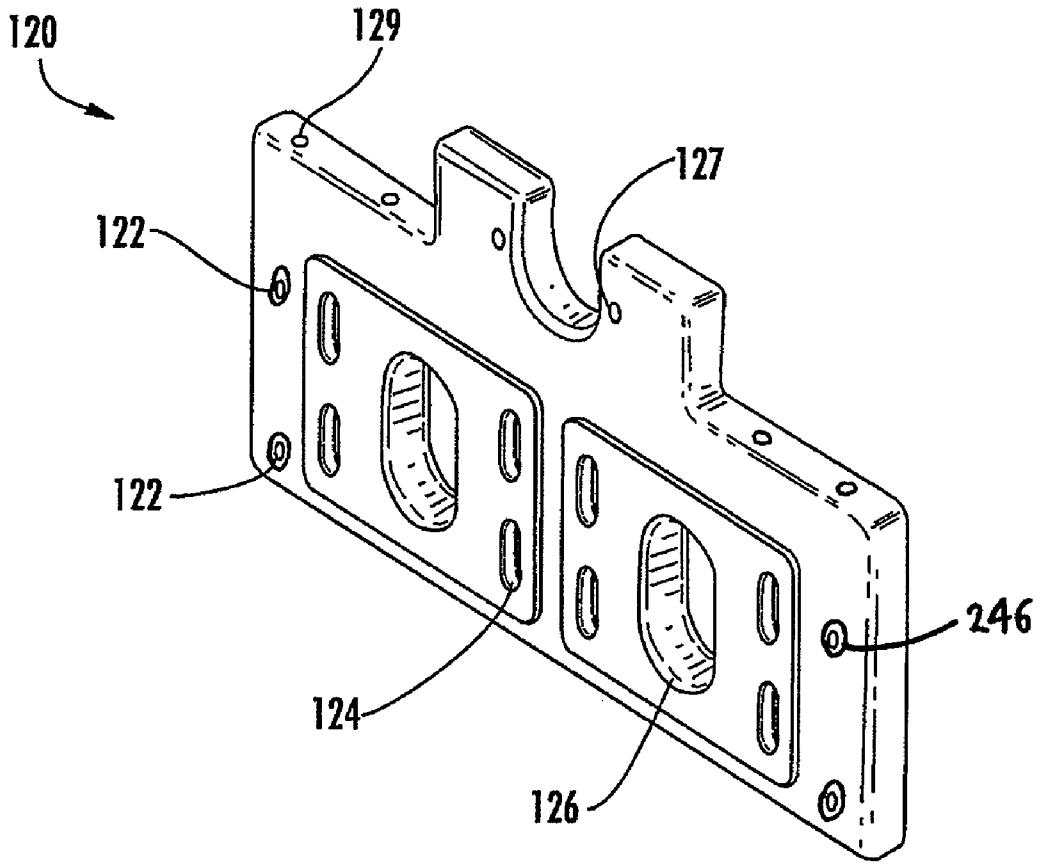


FIG. 5a

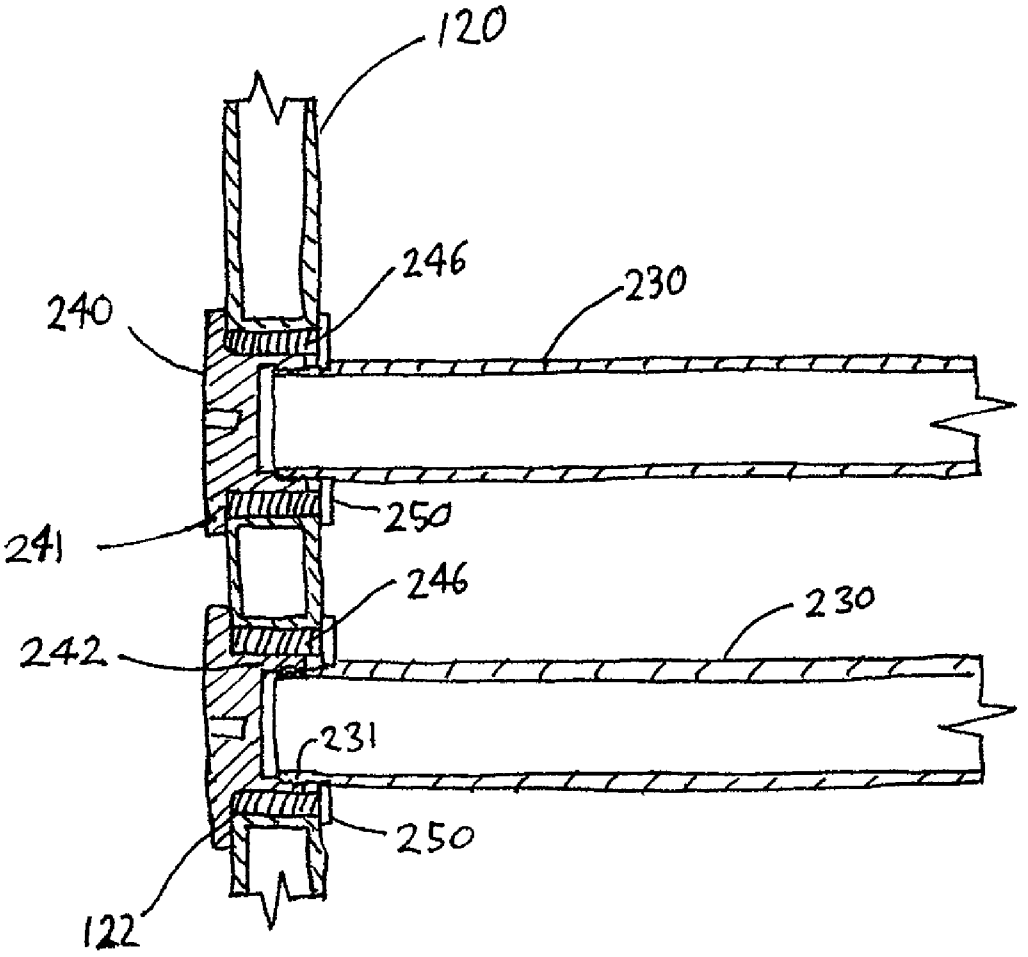


FIG. 56

MODULAR REEL ASSEMBLY

FIELD OF THE INVENTION

[0001] Embodiments of the present invention relate to reels and, more particularly, to a modular reel assembly for winding, dispensing, transporting, or storing hose, cord, or cable.

BACKGROUND OF THE INVENTION

[0002] Long elongate flexible items such as hose, cord, or cable are often stored on a reel. Such reels typically include a spool portion supported by a support structure. The spool portion is typically configured to be rotated relative to the support structure in order to take up or dispense the hose, cord, or cable, which is wound around the spool portion of the reel.

[0003] Such reels can be used in many different industries and environments, and for many different applications. For example, reels are used often in the landscaping industry for hoses used for water or chemical treatment, in the lubrication industry for hoses used for dispensing lubricants, or in the utility industry for cable. Reels for holding hose, cord, or cable may be configured to be mounted on a wall, on the floor, on the ceiling, or on a cart, trailer, or other vehicle. Reels can also be found in the landscaping, firefighting, utility, or fuel industries, typically mounted to a vehicle. The reels may further be configured to have one spool or multiple spools disposed adjacent to one another. Many reels are stored outdoors or are otherwise subject to harsh or hazardous environments. For example, reels for hoses used to transport water or chemicals usually come into contact with the water or chemicals, thereby possibly leading to corrosion of reel components.

[0004] In some instances, reels may be constructed of steel or another metal. The metallic components of the reel may be painted or otherwise coated to provide protection from water or harmful chemicals, to make the reel more esthetically pleasing, or to provide a warning that the reel may hold a hose or cable containing harmful chemicals, gases, or electricity. However, due to the service environment or the particular use of the reel, the coating may chip or peel, thereby exposing the metallic components to the environment and leading to corrosion or other degradation. Reels having metallic components may also be heavy, which may not be desirable if the reel is intended to be portable or is intended to be mounted on a wall, ceiling, or vehicle.

[0005] In some instances, reels may be configured for a specific application and, as such, are usually not readily adaptable to other applications. Furthermore, a manufacturer may only offer a few different size or capacity reels which may also be less than desirable from a flexibility standpoint, since the appropriate reel size depends, for example, on the length, diameter, and/or flexibility of the hose, cord, or cable, which all may vary greatly from application to application. In some instance, the reel may have an application-specific support structure and, thus, may not be flexible with respect to the size or configuration of the support structure to meet other applications. For example, if the reel includes a motor for rotatably driving the spool, the location of the motor is usually fixed, which may be a problem for the user depending on the space constraints dictated by where the user wants to mount the reel.

[0006] Thus, there exists a need for a reel that is durable, lightweight, and readily adaptable to various applications, but also economical and easily assembled. Such a reel should desirably be configured to allow for flexibility and/or customization as to size (of the support structure and/or spool capacity), configuration, color, mounting requirements, and spool rotatability configurations. Such a reel should also desirably be suitable for use in harsh environments where moisture and/or hazardous chemicals may be present.

BRIEF SUMMARY OF THE INVENTION

[0007] The above and other needs are met by the present invention which, according to one aspect, provides a reel for winding, dispensing, transporting, or storing hose, cord, or cable. Such a reel comprises a support assembly including a pair of substantially similar opposed planar support endplates comprised of a polymeric material. At least one first elongate support endplate connecting member having opposed ends extends lengthwise between the opposed support endplates. Each of the at least one first support endplate connecting members has a first defined support endplate connecting element disposed about each end thereof and separated by a first predetermined support assembly width. The first defined support endplate connecting elements are configured to engage the opposed support endplates such that the support endplates are separated by the first predetermined support assembly width. At least one second elongate support endplate connecting member having opposed ends is configured to be interchangeable with the at least one first support endplate connecting member. Each of the at least one second support endplate connecting members has a second defined support endplate connecting element disposed about each end thereof and separated by a second predetermined support assembly width, different from the first predetermined support assembly width. The second defined support endplate connecting elements are configured to engage the opposed support endplates such that the support endplates are separated by the second predetermined support assembly width. A spool assembly is operably engaged with the support assembly, between the support endplates thereof, such that the spool assembly is rotatably supported by the support assembly. Such a spool assembly comprises a pair of substantially similar opposed planar spool endplates comprised of a polymeric material. At least one first elongate spool endplate connecting member having opposed ends extends lengthwise between the opposed spool endplates. Each of the at least one first spool endplate connecting members has a first defined spool endplate connecting element disposed about each end thereof and separated by a first predetermined spool assembly width. The first defined spool endplate connecting elements are configured to engage the opposed spool endplates such that the spool endplates are separated by the first predetermined spool assembly width and cooperate to define an axis extending therebetween. The spool assembly is supported along the axis by the support assembly, when the spool assembly is operably engaged therewith, such that the spool assembly is rotatable about the axis. At least one second elongate spool endplate connecting member having opposed ends is configured to be interchangeable with the at least one first spool endplate connecting member. Each of the at least one second spool endplate connecting members has a second defined spool endplate connecting element

disposed about each end thereof and separated by a second predetermined spool assembly width, different from the first predetermined spool assembly width. The second defined spool endplate connecting elements are configured to engage the opposed spool endplates such that the spool endplates are separated by the second predetermined spool assembly width.

[0008] Another aspect of the present invention provides a method of manufacturing a reel for winding, dispensing, transporting, or storing hose, cord, or cable, wherein the reel comprises a spool assembly rotatably supported by a support assembly. Such a method comprises connecting at least one first elongate support endplate connecting member lengthwise between a pair of substantially similar opposed planar support endplates, wherein the support endplates are comprised of a polymeric material. The at least one first elongate support endplate connecting member has opposed ends, each having a first defined support endplate connecting element disposed thereabout so as to be separated by a first predetermined support assembly width. The first defined support endplate connecting elements are configured to engage the opposed support endplates such that the support endplates are separated by the first predetermined support assembly width, and are interchangeable with at least one second elongate support endplate connecting member having opposed ends, each having a second defined support endplate connecting element disposed thereabout so as to be separated by a second predetermined support assembly width, different from the first predetermined support assembly width. The second defined support endplate connecting elements are configured to engage the opposed support endplates such that the support endplates are separated by the second predetermined support assembly width. At least one first elongate spool endplate connecting member is connected lengthwise between a pair of substantially similar opposed planar spool endplates, wherein the spool endplates are comprised of a polymeric material. The at least one first spool endplate connecting member has opposed ends each having a first defined spool endplate connecting element disposed thereabout so as to be separated by a first predetermined spool assembly width. The first defined spool endplate connecting elements are configured to engage the opposed spool endplates such that the spool endplates are separated by the first predetermined spool assembly width, and are interchangeable with at least one second elongate spool endplate connecting member having opposed ends, each having a second defined spool endplate connecting element disposed thereabout so as to be separated by a second predetermined spool assembly width, different from the first predetermined spool assembly width. The second defined spool endplate connecting elements are configured to engage the opposed spool endplates such that the spool endplates are separated by the second predetermined spool assembly width. The at least one first and second spool endplate connecting members are each configured to connect the opposed spool endplates such that the spool endplates cooperate to define an axis extending therebetween. The spool assembly is then operably engaged with the support assembly such that the spool assembly is supported along the axis by the support assembly and is rotatable about the axis.

[0009] Accordingly, embodiments of the present invention provide significant advantages, as discussed herein in further detail.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0010] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

[0011] FIGS. **1***a* and **1***b* are perspective views of a reel according to one embodiment of the present invention;

[0012] FIG. **2***a* is a perspective view of a support assembly according to one embodiment of the present invention;

[0013] FIG. **2***b* is a perspective view of a support endplate according to one embodiment of the present invention;

[0014] FIG. **3***a* is a perspective view of a spool assembly according to one embodiment of the present invention;

[0015] FIG. **3***b* is a perspective view of a spool endplate according to one embodiment of the present invention;

[0016] FIG. **4***a* is a perspective view of an endplate connecting member according to one embodiment of the present invention;

[0017] FIGS. **4***b* and **4***c* are perspective views of a securing member configured to cooperate with an endplate connecting member according to one embodiment of the present invention;

[0018] FIG. **4***d* is a cross-sectional view illustrating a connection between a support endplate and two support endplate connecting members using two securing members, according to one embodiment of the present invention;

[0019] FIG. **4***e* is a perspective view of one embodiment of the support assembly utilizing one embodiment of the support endplate connecting members and one embodiment of the securing members;

[0020] FIG. **5***a* is a perspective view of a support endplate having tubular inserts, according to one embodiment of the present invention; and

[0021] FIG. **5***b* is a cross-sectional view illustrating a connection between a support endplate and two support endplate connecting members using two securing members and two tubular inserts, according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0022] The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the inventions are shown. Indeed, these inventions may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

[0023] FIGS. **1***a* and **1***b* are perspective views of a reel **1** according to one embodiment of the present invention, comprising a support assembly **110** and a spool assembly **10**. The support assembly **110** is configured to support the spool assembly **10** so that the spool assembly **10** may rotate relative to the support assembly **110**. Such a configuration allows the spool assembly **10** to wind or dispense a hose, cord, or cable (not shown). One skilled in the art will

appreciate that the terms "hose," "cords," or "cable," as used herein refer to any flexible elongate item suited to be wound or stored on a reel. Such a flexible elongate item may be, for example, a tubular hose, such as a round or flat hose for transporting a gas or liquid; electrical cable; rope; yarn; string; continuous sheet-like material; steel cable; chain; or the like. Similarly, references herein to a "reel" or a "hose reel" refer to a reel apparatus for winding, dispensing, transporting, and/or storing any such flexible elongate member as disclosed herein.

[0024] The support assembly **110** comprises two opposing support endplates **120** connected by elongate support endplate connecting members **130**. In one exemplary embodiment, the two opposing support endplates **120** are generally planar, and are substantially similar. That is, in some instances, a single support endplate configuration is capable of being used as either or both of the two opposing support endplates **120** of the support assembly **110**. According to one advantageous aspect, the single support endplate configuration is used as both of the two opposing support endplates **120**. The elongate support endplate connecting members **130** may be, for example, generally cylindrical and are attached at each opposing end thereof to one of the two opposing support endplates **120**. In one embodiment, the support endplates **120** each define apertures **122** configured to receive the ends of the support endplate connecting members **130** for connecting the support endplate connecting members **130** to the support endplates **120**. The support endplate connecting members **130** cooperate with the support endplates **120** to define a predetermined support assembly width W_1, which is defined herein as the distance between the support endplates **120**. The support endplates **120**, the support endplate connecting members **130**, and the manner in which the support endplate connecting members **130** are connected to the support endplates **120**, are discussed in greater detail herein, for example, with reference to FIGS. **2***a*, **2***b*, and **4***a-e*.

[0025] The spool assembly **10** is similarly comprised of two opposing spool endplates **20** connected by elongate spool endplate connecting members **30**. In one exemplary embodiment, the two opposing spool endplates are generally planar, and are substantially similar. That is, in some instances, a single spool endplate configuration is capable of being used as either or both of the two opposing spool endplates **20** of the spool assembly **10**. According to one advantageous aspect, the single spool endplate configuration is used as both of the two opposing spool endplates **20**. The elongate spool endplate connecting members **30** may be, for example, generally cylindrical and are attached at each opposing end thereof to one of the two opposing spool endplates **20**. In one embodiment, the spool endplates **20** each define apertures **22** configured to receive the ends of the spool endplate connecting members **30** for connecting the spool endplate connecting members **30** to the spool endplates **20**. The spool endplate connecting members **30** cooperate with the spool endplates **20** to define a support surface between the two spool endplates **20** for supporting the hose, cord, or cable, and further determine the spool assembly width W_2, which is defined herein as the distance between the spool endplates **20**. The spool endplates **20**, the spool endplate connecting members **30**, and the manner in which the spool endplate connecting members **30** are connected to the spool endplates **20**, are discussed in greater detail herein, for example, with reference to FIGS. **3***a*, **3***b*, and **4***a-d*.

[0026] As shown in FIGS. **1***a* and **1***b*, the width of the spool assembly **10** is configured such that the spool endplates **20**/spool endplate connecting members **30** fit between the support endplates **120** of the support assembly **110**. The spool assembly **10** defines an axis extending through the spool endplates **20**, wherein the spool assembly **10** is supported by the support assembly **110** such that the spool assembly **10** is capable of rotating about the axis relative to the support assembly **110**. In an exemplary embodiment, as shown in FIGS. **1***a* and **1***b*, the spool assembly **10** includes axles **40** and **41** that are each coupled to a corresponding one of the two spool endplates **20**. Each of the support endplates **120** includes a cutout or aperture **42** for receiving a corresponding axle. In some instances, a bearing **140** engages each axle to facilitate the rotation of the spool assembly **10** relative to the support assembly **110**. For example, the bearings **140** may be mounted to the support endplates **120** via fasteners engaging apertures **127**, disposed on either side of a U-shaped cutout defined by the support endplates **120**. One skilled in the art will appreciate, however, that the bearings **140** may be otherwise mounted to the support endplates **120** or spool endplates **20**, or that other mechanisms for rotatably supporting the spool assembly **10** may be implemented. For example, in one embodiment, the axles **40**, **41** may be coupled to the support endplates **120** and the bearings **140** may be coupled to the spool endplates **20**. In another embodiment, one axle may traverse the width of the spool assembly **10**, instead of using separate axles attached to each spool endplate.

[0027] The spool assembly **10** is assembled with the support assembly **110** to form the reel **1**, wherein the reel **1** may further include a mechanism for driving the rotation of the spool assembly **10** relative to the support assembly **110**. In some instances, the drive mechanism for the reel **1** may be actuated to rotate the spool assembly **10** in a first direction in order to wind the hose, cord, or cable onto the spool assembly **10**. The drive mechanism may also be actuated to rotate the spool assembly **10** in a second direction, opposite to the first direction, in order to dispense the hose, cord, or cable that is already wound onto the spool assembly **10**. FIGS. **1***a* and **1***b* illustrate two exemplary drive mechanisms for the reel **1**: a motor driven system and a hand crank system. The reel **1** may include both drive systems or may only have one such drive system. One skilled in the art will appreciate that the reel **1** may also use any other suitable drive system or may not have any drive system other than that of allowing a user to physically rotate the spool endplates **20** directly by hand.

[0028] The motor driven system of FIG. **1***a* comprises an electric motor **160** coupled to one of the support endplates **120**. In one embodiment, the motor is a hazardous duty motor suitable for use in hazardous duty environments where volatile gases or other hazardous fluids may be present. In some instances, the motor **160** includes a flange **162** with apertures for mounting the motor to one of the support endplates **120**. These apertures are aligned with corresponding apertures **124** defined by the support endplate **120** so that a bolt, screw, or other appropriate fastener (not shown) may be used to mount the motor **160** to the side of the support endplate **120**. The motor **160** includes driveshaft (not shown) that extends through aperture **126** in the support endplate **120**. A sprocket **161** is coupled to the driveshaft and engages a chain **65**. The chain **65** also engages a spool sprocket **60**, which is coupled to a spool endplate **20**, so that

rotation of the driveshaft causes rotation of the spool assembly **10**. In the illustrated embodiment, the motor mount apertures **124** and **126** of the spool endplates **120** are elongated so that the position of the motor can be adjusted in order to fit the chain **65** around the sprocket **161** and in order to appropriately adjust the tension of the chain **65**. In some instances, such as that shown, the reel **1** includes four substantially identical motor mount provisions, two defined by each support endplate **120**, which may provide the flexibility for mounting the motor in the location that best suits the particular configuration of the reel **1**. In other instances, the substantially similar support and spool endplates may facilitate assembly of the reel **1** regardless of which respective endplate is used on either side of the reel **1**.

[0029] FIG. **1***b* illustrates one embodiment of a hand crank system that may be implemented in conjunction with the reel **1** in order to drive the rotation of the spool assembly **10**. A hand crank support assembly **165** is coupled to a support endplate **120** and attached thereto with appropriate fasteners via apertures **129**. In some instances, such as that shown, four substantially identical sets of apertures **129** may be provided, two sets being defined by each support endplate **120**. Such provisions may provide the flexibility as to where the hand crank support assembly **165** is located and may provide easier assembly of the reel **1** regardless of which respective endplate is used on either side of the reel **1**. The hand crank support assembly **165** rotatably supports a hand crank driveshaft **167** (e.g., via a bearing component of the hand crank support assembly **165**). A hand crank sprocket **166** is coupled to one end of the hand crank driveshaft **167**, and engages a second spool sprocket **62** coupled to one of the spool endplates **20**. A lever (not shown) may be removably coupled to the other end of the hand crank driveshaft **167** to allow a user to rotate the driveshaft **167** and, thereby, cause the spool assembly **10** to rotate relative to the support assembly **110**.

[0030] FIG. **2***a* is a perspective view of one embodiment of the support assembly **110**, comprising two substantially similar opposing support endplates **120**. FIG. **2***b* depicts a single support endplate **120**, according to such an embodiment. The support endplate **120** is comprised of a polymeric material such as, for example, low density polyethylene (LDPE) or high density polyethylene (HDPE). In one exemplary embodiment, at least one of the support endplates **120** is comprised of, for example, a rotomolded polymeric material, wherein, in some instances, the rotomolded polymeric material may include a foam core such as, for example, a polyurethane foam core.

[0031] In the embodiment illustrated by FIG. **2***a*, the two opposing planar support endplates **120** are interconnected, for example, by four elongate support endplate connecting members **130**. One skilled in the art will appreciate, however, that other embodiments of the support assembly **110** may include any number of such support endplate connecting members **130**. Similarly, the connecting members **130** may be positioned at locations or in orientations between the support endplates **120** other than those illustrated by the figures. In one embodiment, two support endplate connecting members **130** may be located parallel to each other (e.g., as shown in FIGS. **1***a*-**2***a*) and configured to allow the hose, cord, or cable to pass therebetween. In this regard, the two parallel support endplate connecting members **130** may serve as a guide for guiding the hose, cable, or cord onto the spool assembly **10**. In other embodiments, a separate hose guide may be coupled to the support assembly **110** for guiding the hose, cable, or cord onto the spool assembly **10**. The support endplates **120** are substantially identical, or at least substantially similar, and, as such, may be interchangeable between sides of the support assembly **110**.

[0032] Although not shown in the figures, the support assembly **110** may comprise various other apertures or structures such as structures for mounting the support assembly to a vehicle, a floor, the ground, a wall, a ceiling, a set of wheels, etc. Such structures may be molded into the support assembly **110** or may be separate structures that can be attached to the support endplates **120** or support endplate connecting members **130**.

[0033] FIG. **3***a* is a perspective view of one embodiment of the spool assembly **10**, comprising two substantially similar opposing spool endplates **20**, coupled together by at least one, or a plurality, of elongate spool endplate connecting members **30**. FIG. **3***b* depicts a single spool endplate **20** comprised of, for example, a polymeric material, such as low density polyethylene (LDPE) or high density polyethylene (HDPE). In one exemplary embodiment, at least one of the spool endplates **20** is comprised, for example, of a rotomolded polymeric material, wherein, in some instances, the rotomolded polymeric material may include a foam core such as, for example, a polyurethane foam core. The spool endplates **20** are substantially identical, or at least substantially similar and as such, may be interchangeable between sides of the spool assembly **10**.

[0034] The spool endplates **20** may also define apertures **23** for fastening the axles **40** and **41** to the spool endplates **20**. In addition, the spool endplates **20** may further define a circular aperture **42** disposed about the center of the endplates **20** so that the axles **40** and **41** may pass therethrough. The apertures **42** may also be used to pass a pipe, hose, or cable therethrough as an extension or connection from one end of the hose, cord, or cable wound on the spool assembly **10**, to one end of an external hose, cord, or cable. In instances where the reel **1** is configured for storing a hose, one of the axles **41** may comprise a pipe **50** used to connect one end of the hose wound on the reel **1** to one end of an external hose or pipe. In one embodiment, the end of the pipe **52** that extends out from the support assembly **110** may comprises a rotatable coupling for removably attaching an external hose or pipe to the end of the pipe **52** so that, when the axle **41** rotates with the spool assembly **10**, the external hose or pipe connected to the end **52** of the pipe is not also required to rotate. If the reel **1** is configured for storing electrical or other cable, the reel **1** may comprise a cable extension having the appropriate connectors. In some embodiments, however, no such extension or connector is implemented, and the cord or cable is simply wound about the spool assembly **10**.

[0035] The spool endplates **20** further define apertures **22** for connecting the spool endplate connecting members **30** to the spool endplates **20**. The apertures **22** are spaced about the spool endplate **20**, in some instances at equal distances from the center of the spool endplate **20**, so that when the spool endplate connecting members **30** are engaged with the apertures **22**, the spool endplate connecting members **30** cooperate to define a support structure for supporting the hose, cord, or cable. Although not shown in the figures, the spool endplates **20** may further define other apertures that cooperate to define generally concentric perimeters with

respect to the perimeter defined by the illustrated apertures **22**. These additional apertures could also be used for connecting the spool endplate connecting members **30** to the spool endplates **20**. Such a configuration may allow the dimensions of the support surface to be appropriately varied by moving the spool endplate connecting members **30** from one set of the apertures **22** to another set of concentric apertures defined by the spool endplates **20**. In one embodiment, the apertures **22** are used both to connect the spool endplate connecting members **30** and the sprockets **60** and **62** of the drive mechanism to the spool endplates **20**. The details of such a connection are described in greater detail below in accordance with one embodiment of the invention. In another embodiment (not shown), other apertures or structures are defined by the spool endplates **20** for attaching the sprockets **60** and **62** or other items to the spool endplates **20**.

[0036] In some instances, the spool endplates **20** may further comprise at least one circular step portion **21** that extends inwardly toward the center of the spool assembly **10**. These step portions **21** may function, for example, to partially support at least a portion of the wound hose, cord, or cable. In addition, the outward face of the spool endplate **20** may define at least one recess **24**. This recess **24** may provide, for instance, a space for receiving the sprocket **62** used in the hand crank drive system. If a motor-driven drive system is used in the reel **1**, spacers **25** may be used for separating the sprocket **61** from the side of the spool endplate **20** to allow sufficient room for the chain **65** to pass over the sprocket **60** and around the motor sprocket **161**. Such steps and recesses may further add structural integrity to the spool endplates **20**. In other embodiments, however, the spool endplates **20** do not have any step or recess.

[0037] FIG. **4***a* is an illustration of an exemplary embodiment of an endplate connecting member **230**, such as that which can be used as a spool endplate connecting members **30** and/or a support endplate connecting members **130**. The connecting member **230** is elongate with opposed ends. In some instances, the connecting member **230** may be cylindrical. The connecting member **230** may be, for example, a solid member or a hollow tube, and made of any material suitable for application to the support and/or spool assemblies **110**, **10**. In one embodiment, the connecting members **230** may be comprised of hollow metal tubing or pipe such as steel tubing, and may be plated, painted, or otherwise coated or treated to improve the corrosion resistance thereof. Such connecting members **230** are configured to extend between the support or spool endplates **120**, **20**, as appropriate, so as to couple the respective endplates together. In some instances, each connecting member **230** comprises two defined connecting elements disposed about the ends thereof, with the connecting elements being separated by an elongate medial portion **232**. The separation distance W between the defined connecting elements determines the width W_1 of the support assembly or the width W_2 of the spool assembly.

[0038] The connecting elements may comprise, for example, threaded end portions **231** of the connecting member **230**, wherein the threaded end portions **231** may be configured to operably engage a complementary threaded securing member **240**. FIGS. **4***b* and **4***c* illustrate two different views of the securing member **240** according to one embodiment of the present invention. In such instances, the securing member **240** may comprise a first head portion **241** and a continuous second tubular portion **242**, wherein the internal wall **243** of the tubular portion **242** may be threaded so as to be capable of engaging the threaded end **231** of the connecting member **230**. The head portion **241** is of a greater dimension than the tubular portion **242** and may define apertures **244**, **245** configured to be engaged by a complementary tool (not shown) for tightening or loosening the securing member **240** with respect to an engagement with the connecting member **230**. The aperture **244** may also be threaded and configured to engage a screw or bolt, for example, for attaching the sprockets **60** and/or **61** to the spool assembly **10**. For example, the sprockets **60**, **61** may define apertures corresponding to the apertures **22** used for engaging the spool endplate connecting members **30**. Thus, after the spool endplate connecting members **30** are attached to the spool endplates **20** using the securing members **240**, the sprockets **60** and/or **61** can be bolted to the spool endplates **20** using apertures **244** in the securing members **240**.

[0039] FIG. **4***d* illustrates a cross-sectional view of two endplate connecting members **230** coupled to a support endplate **120** using securing members **240**, according to one embodiment of the present invention. The apertures **122** defined by the support endplate **120** are configured to receive the tubular portion **242** of the securing member **240** such that the head portion **241** of the securing member **240** abuts the support endplate **120** when securing member **240** is screwed onto the threaded end **231** of the connecting member **230**. The diameter of the threaded end **231** of the connecting member **230** is less than the diameter of the medial portion **232** so that a washer **250** may be disposed about the threaded end **231**, without being movable over the medial portion **232** of the connecting member **230**. In this manner, when the securing member **240** is screwed onto the end **231** of the endplate connecting member **230**, the support endplate **120** is secured between the washer **250** and the head portion **241** of the securing member **240**. In other embodiments, the diameter of the threaded portion **231** of connecting member **230** may be sufficiently less than the diameter of the medial portion **232** such that a washer **250** may not be necessary. The spool endplate connecting members **30** may be coupled to the spool endplates **20** in a similar manner to that disclosed herein with reference to the support assembly **110**.

[0040] FIG. **4***e* is a perspective view of a support assembly **110** utilizing the endplate connecting members **230**, securing members **240**, and washers **250** to connect the two support endplates **120**, according to one embodiment of the present invention. The spool assembly **10** can be formed in a similar manner using endplate connecting members **230**, securing members **240**, and washers **250**. As can be seen in the figures, the length W of the medial portion **232** of the connecting members **230** generally determines the distance W_1 or W_2 between the support endplates **120** or spool endplates **20**, respectively.

[0041] One skilled in the art will thus appreciate that embodiments of the present invention facilitates adjustability of the width of the support assembly **110** and/or the spool assembly **10**, by changing the connecting members **230**, as appropriate. That is, various sets of connecting members **230** may be formed, with each set having a different length W of the medial portion **232** between the threaded end portions **231** of the connecting member **230**, whereby the width of the support and/or spool assemblies **110**, **10** can be readily

varied to meet the requirements of a particular application. This adjustability may be advantageous since the support assembly **110** can be readily adjusted to suit mounting constraints and support needs, while the spool assembly **10** can be readily adjusted to suit size constraints and spool capacity needs. Similarly, for instance, the material used for the connecting members **230** or the gauge of the connecting members **230** may be varied depending upon the strength requirements or weight constraints for the reel **1**. Thus, the reel **1** can be readily customized by changing the connecting members **230**.

[0042] FIGS. **5***a* and **5***b* illustrate another exemplary embodiment of an endplate, where one or more tubular inserts **246** are associated with one or more of the apertures **122** to provide, for example, greater strength and rigidity of the reel assembly **1** by reinforcing the endplate **120** about the apertures **122**. The tubular inserts **246** may be made from a metallic material, such as aluminum. For instance, the tubular inserts **246** may be cut from hollow metal tubing or pipe, such as aluminum tubing. The tubular inserts **246** comprise an outside diameter and an inside diameter. Preferably, the outside diameter is such that the insert **246** fits snugly within the aperture **122** defined by the endplate **120**, and the inside diameter is such that the connecting member **230** fits snugly within the tubular insert **246**.

[0043] For example, FIG. **5***b* illustrates a cross-sectional view of a portion of a support assembly **110** implementing such tubular inserts **246**, according to one embodiment of the present invention. FIG. **5***b* shows two securing members **240** being used to couple two connecting members **230** to a support endplate **120** that is equipped with two tubular inserts **246**. As can be seen in the figure, the tubular insert **246** is configured to receive the tubular portion **242** of the securing member **240** which is screwed onto the threaded end portion **231** of the endplate connecting member **230**. In one embodiment, the length of the tubular insert **246** is roughly the width of the endplate **120** at the location of the aperture **122**, such that the tubular insert **246** is secured between the washer **250** and the head portion **241** of the securing member **240** when the securing member **240** is screwed onto the end of the connecting member **230**, as shown in FIG. **5***b*.

[0044] In one embodiment, the tubular inserts **246** are molded into the polymeric endplates **120** at the time the endplates **120** are molded. In such an embodiment, the molded-in inserts **246** define the endplate apertures **122** configured to receive the ends of the support endplate connecting members **130** for connecting the support endplate connecting members **130** to the support endplates **120**. Although FIGS. **5***a* and **5***b* illustrate tubular inserts **246** used in connection with the apertures **122** of a support endplate **120**, such tubular inserts **246** may also be used in a similar manner in connection with one or more of the apertures **22** of a spool endplate **20**.

[0045] One skilled in the art will thus appreciate that embodiments of the present invention provide an improved reel that may provide a strong, durable, corrosion resistant, lightweight, modular and customizable reel that is relatively easy to manufacture and assemble. For example, according to one embodiment of the present invention, a supply of substantially similar polymeric spool endplates can be made from a first mold and a supply of substantially similar polymeric support endplates can be made from a second mold, with both supplies of endplates being manufactured with a single rotomolding machine. A supply of substantially similar endplate connecting members, varying in length (and/or width), can also be manufactured for use as spool endplate connecting members **30** and/or support endplate connecting members **130**.

[0046] Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed:

1. A reel for winding, dispensing, transporting, or storing hose, cord, or cable, the reel comprising:

a support assembly comprising:

a pair of substantially similar opposed planar support endplates comprised of a polymeric material;

at least one first elongate support endplate connecting member having opposed ends and extending lengthwise between the opposed support endplates, each of the at least one first support endplate connecting members having a first defined support endplate connecting element disposed about each end thereof and separated by a first predetermined support assembly width, the first defined support endplate connecting elements being configured to engage the opposed support endplates such that the support endplates are separated by the first predetermined support assembly width; and

at least one second elongate support endplate connecting member having opposed ends and configured to be interchangeable with the at least one first support endplate connecting member, each of the at least one second support endplate connecting members having a second defined support endplate connecting element disposed about each end thereof and separated by a second predetermined support assembly width different from the first predetermined support assembly width, the second defined support endplate connecting elements being configured to engage the opposed support endplates such that the support endplates are separated by the second predetermined support assembly width; and

a spool assembly operably engaged with the support assembly, between the support endplates thereof, such that the spool assembly is rotatably supported by the support assembly, the spool assembly comprising:

a pair of substantially similar opposed planar spool endplates comprised of a polymeric material;

at least one first elongate spool endplate connecting member having opposed ends and extending lengthwise between the opposed spool endplates, each of the at least one first spool endplate connecting members having a first defined spool endplate connecting element disposed about each end thereof and separated by a first predetermined spool assembly width, the first defined spool endplate connecting elements being configured to engage the opposed spool endplates such that the spool endplates are separated by

the first predetermined spool assembly width and cooperate to define an axis extending therebetween, the spool assembly being supported along the axis by the support assembly, when the spool assembly is operably engaged therewith, such that the spool assembly is rotatable about the axis; and

at least one second elongate spool endplate connecting member having opposed ends and configured to be interchangeable with the at least one first spool endplate connecting member, each of the at least one second spool endplate connecting members having a second defined spool endplate connecting element disposed about each end thereof and separated by a second predetermined spool assembly width different from the first predetermined spool assembly width, the second defined spool endplate connecting elements being configured to engage the opposed spool endplates such that the spool endplates are separated by the second predetermined spool assembly width.

2. A reel according to claim **1**, wherein one of the support endplates and spool endplates is comprised of a rotomolded polymeric material.

3. A reel according to claim **1**, wherein one of the support endplates and spool endplates comprises a polyurethane foam core.

4. A reel according to claim **1**, wherein the connecting members are comprised of a metallic material.

5. A reel according to claim **1**, wherein the first and second predetermined support assembly widths and the first and second predetermined spool assembly widths are nonadjustable.

6. A reel according to claim **1**, wherein the first elongate support endplate connecting member, the second elongate support endplate connecting member, the first elongate spool endplate connecting member, and the second elongate spool endplate connecting member have substantially similar cross-sections.

7. A reel according to claim **1**, wherein each support endplate defines an aperture configured to receive at least a portion of one of the support endplate connecting elements of one of the support endplate connecting members.

8. A reel according to claim **1**, wherein at least one of the support endplates comprises a mount configured to receive at least one of a motor and a manual crank, the at least one of the motor and the manual crank being configured to operably engage the spool assembly so as to provide rotation thereof about the axis and with respect to the support assembly.

9. A reel according to claim **1**, further comprising a bearing and an axle operably engaged between the support assembly and the spool assembly and cooperable to allow the spool assembly to be rotatable about the axis and with respect to the support assembly, one of the bearing and the axle being coupled to one of the support endplates, and the other of the bearing and the axle being coupled to one of the spool endplates.

10. A reel according to claim **1**, further comprising a guide member operably engaged with the support assembly and adapted to guide one of a hose, a cord, and a cable therethrough to be wound onto the spool assembly.

11. A reel according to claim **1**, further comprising:

a gear mounted to one of the spool endplates; and

a drive mechanism operatively coupled to the gear and configured to drive the spool assembly to rotate about the axis of the spool assembly.

12. A reel according to claim **7**, wherein the aperture is configured to receive the connecting element of a connecting member, the connecting element comprising a threaded end portion of the connecting member, with opposing threaded end portions being separated by an unthreaded medial portion of the connecting member and the medial portion having a greater diameter than the end portions, the connecting element being configured to be operably engaged by a complementarily-threaded securing member so as to secure the support endplate between the unthreaded medial portion of the connecting member and the securing member.

13. A reel assembly according to claim **1**, wherein one of the support endplates and spool endplates is comprised of a molded polymeric material, and wherein the one of the support endplates and spool endplates comprises a tubular insert operably engaged with and extending axially through the polymeric material, the tubular insert being configured to receive at least a portion of one of the support endplate and spool endplate connecting elements of one of the support endplate and spool endplate connecting members.

14. A method of manufacturing a reel for winding, dispensing, transporting, or storing hose, cord, or cable, the reel comprising a spool assembly rotatably supported by a support assembly, the method comprising:

connecting at least one first elongate support endplate connecting member lengthwise between a pair of substantially similar opposed planar support endplates, the support endplates being comprised of a polymeric material, and the at least one first elongate support endplate connecting member having opposed ends each having a first defined support endplate connecting element disposed thereabout so as to be separated by a first predetermined support assembly width, the first defined support endplate connecting elements being configured to engage the opposed support endplates such that the support endplates are separated by the first predetermined support assembly width, and being interchangeable with at least one second elongate support endplate connecting member having opposed ends each having a second defined support endplate connecting element disposed thereabout so as to be separated by a second predetermined support assembly width different from the first predetermined support assembly width, the second defined support endplate connecting elements being configured to engage the opposed support endplates such that the support endplates are separated by the second predetermined support assembly width;

connecting at least one first elongate spool endplate connecting member lengthwise between a pair of substantially similar opposed planar spool endplates, the spool endplates being comprised of a polymeric material, and the at least one first spool endplate connecting member having opposed ends each having a first defined spool endplate connecting element disposed thereabout so as to be separated by a first predetermined spool assembly width, the first defined spool endplate connecting elements being configured to engage the opposed spool endplates such that the spool endplates are separated by the first predetermined spool assembly width, and being interchangeable with at least

one second elongate spool endplate connecting member having opposed ends each having a second defined spool endplate connecting element disposed thereabout so as to be separated by a second predetermined spool assembly width different from the first predetermined spool assembly width, the second defined spool endplate connecting elements being configured to engage the opposed spool endplates such that the spool endplates are separated by the second predetermined spool assembly width, the at least one first and second spool endplate connecting members each being configured to connect the opposed spool endplates such that the spool endplates cooperate to define an axis extending therebetween; and

operably engaging the spool assembly with the support assembly such that the spool assembly is supported along the axis by the support assembly and is rotatable about the axis.

15. A method according to claim **14** further comprising forming at least one of the support endplates and the spool endplates from the polymeric material using a rotomolding process about a polyurethane foam core.

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