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(54) **GEARLESS HOSE TRACKING ASSEMBLY FOR HOSE REEL APPLICATIONS**

(52) **U.S. Cl. 137/355.26**

(57) **ABSTRACT**

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A hose reel guide device including a base, a housing structure, a static shaft, a guide wheel, a tracker body, and a roller assembly. The base includes a static shaft mounted on a housing structure which is capable of pivoting on the base. The guide wheel is adapted to circumferentially engage a portion of the static shaft and also adapted to receive a hose. The guide wheel is configured to oscillate about the static shaft as the guide wheel translates from end to end on the static shaft, when a moving hose passes therethrough. The tracker body is mounted about the guide wheel to cooperatively move along the shaft with the guide wheel and includes a channel adapted to receive a portion of the hose. The roller assembly is positioned offset the axis of rotation of the guide wheel to maintain greater surface contact between the hose and the guide wheel so as to provide less opportunity for the hose to "jump"/skip/flail on the guide wheel and negligible drag on the hose.

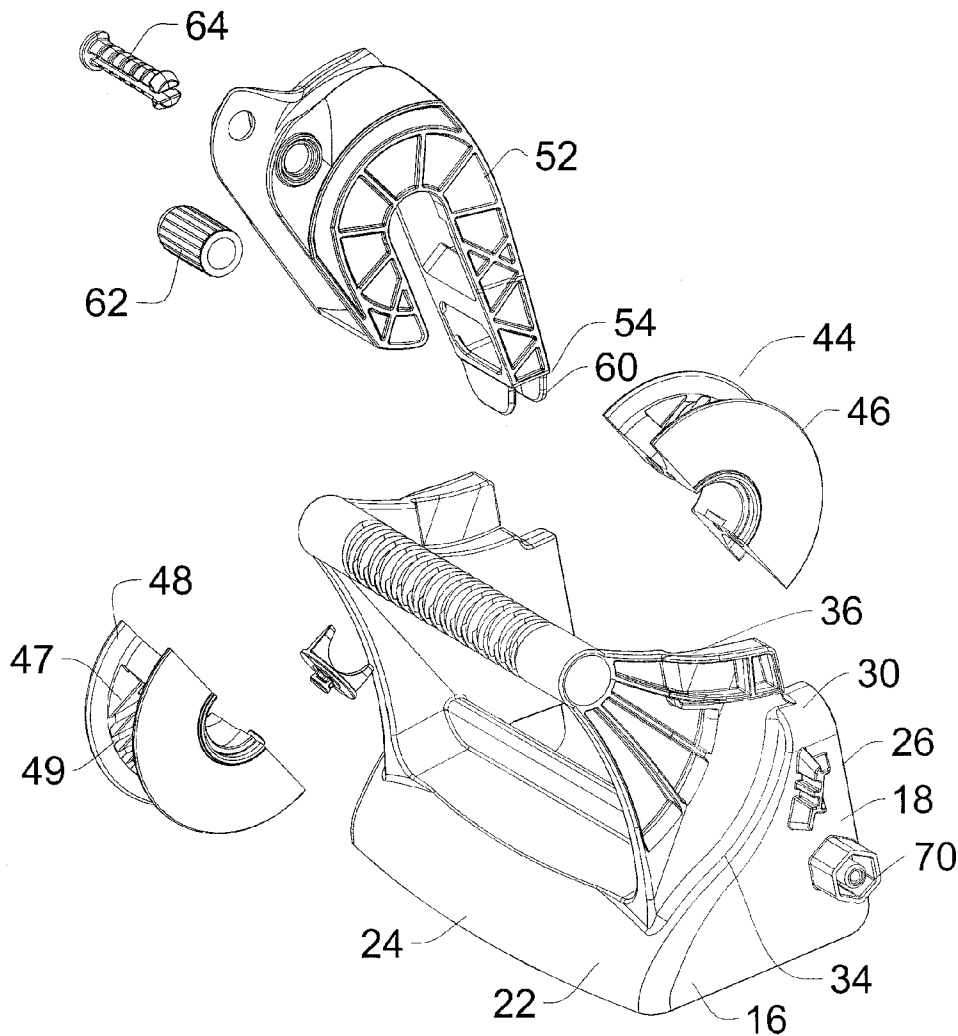
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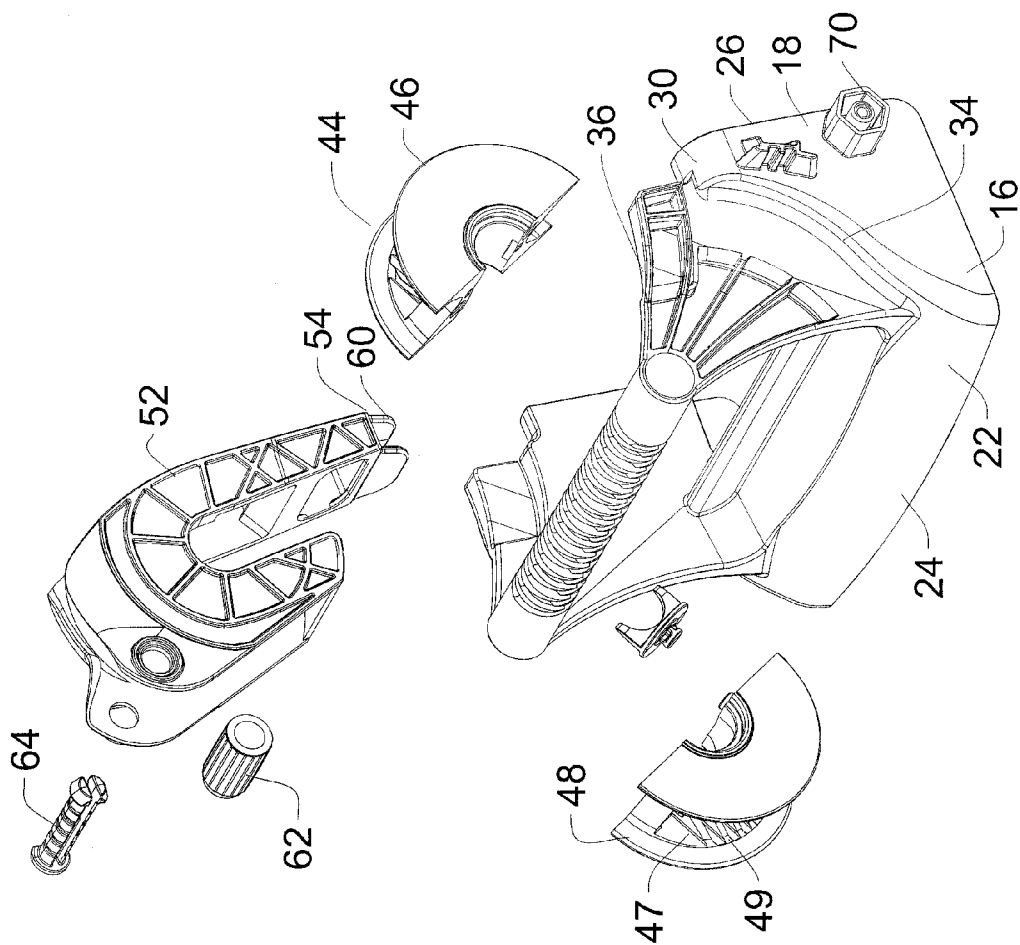


Fig. 1

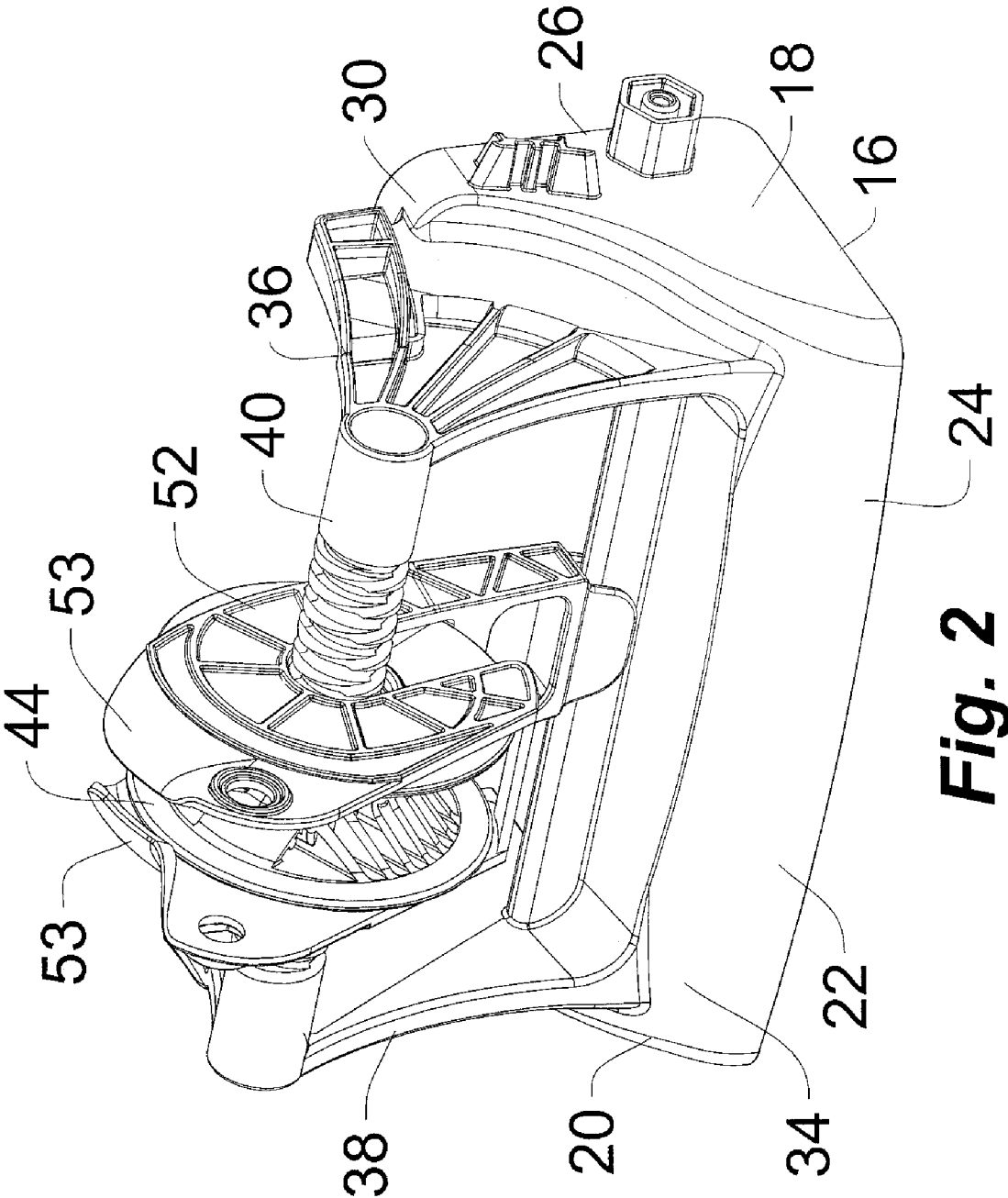


Fig. 2

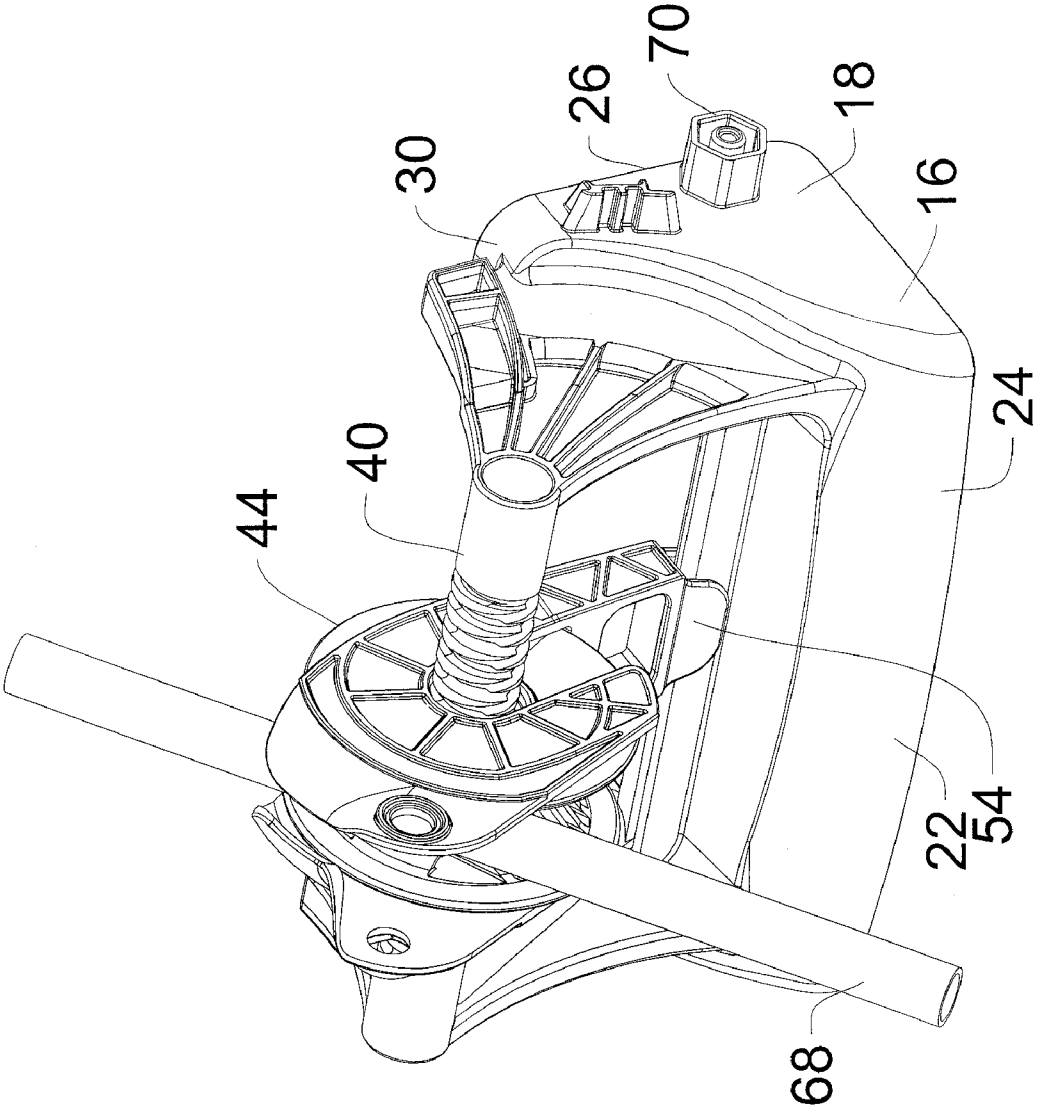


Fig. 3

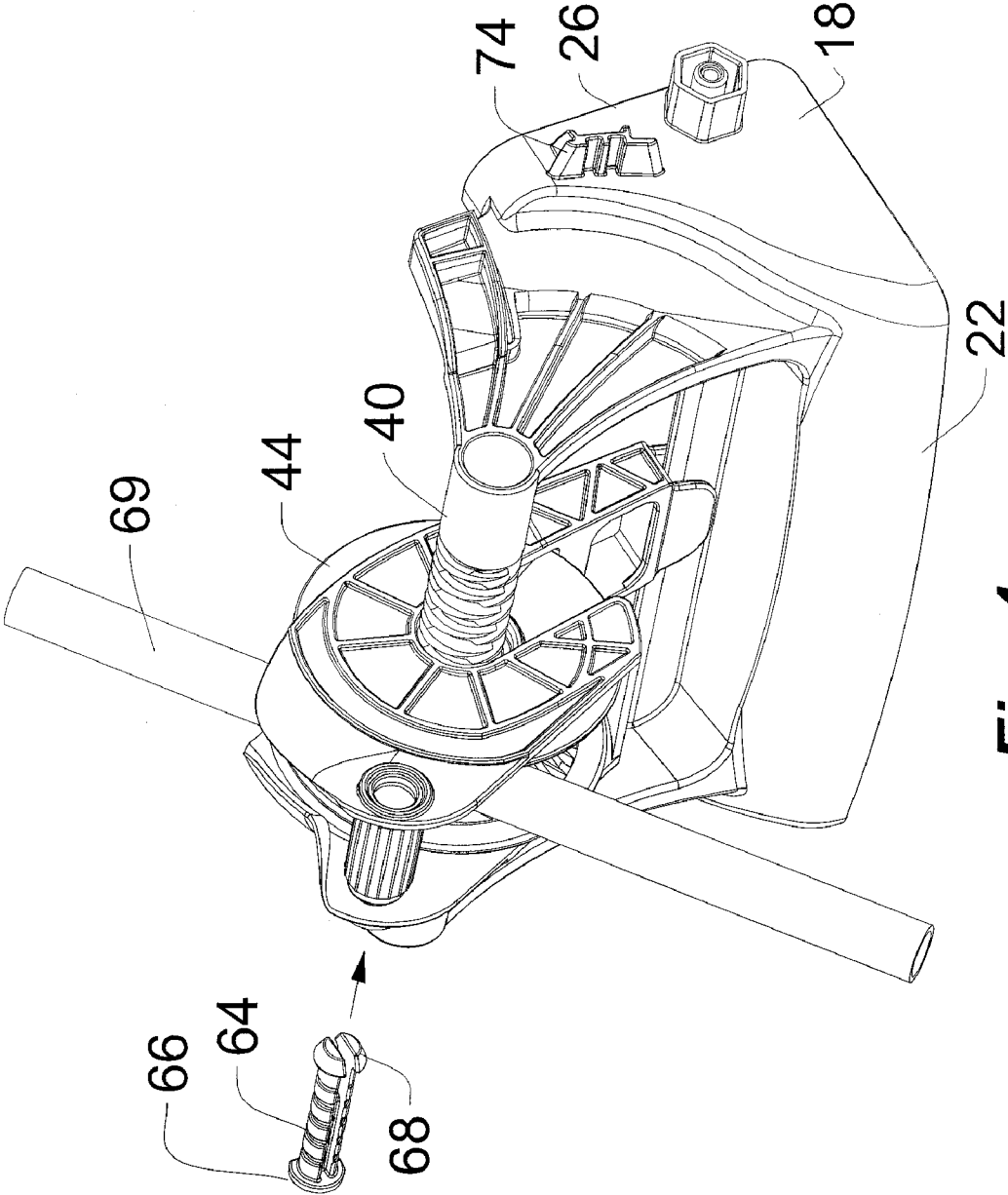


Fig. 4

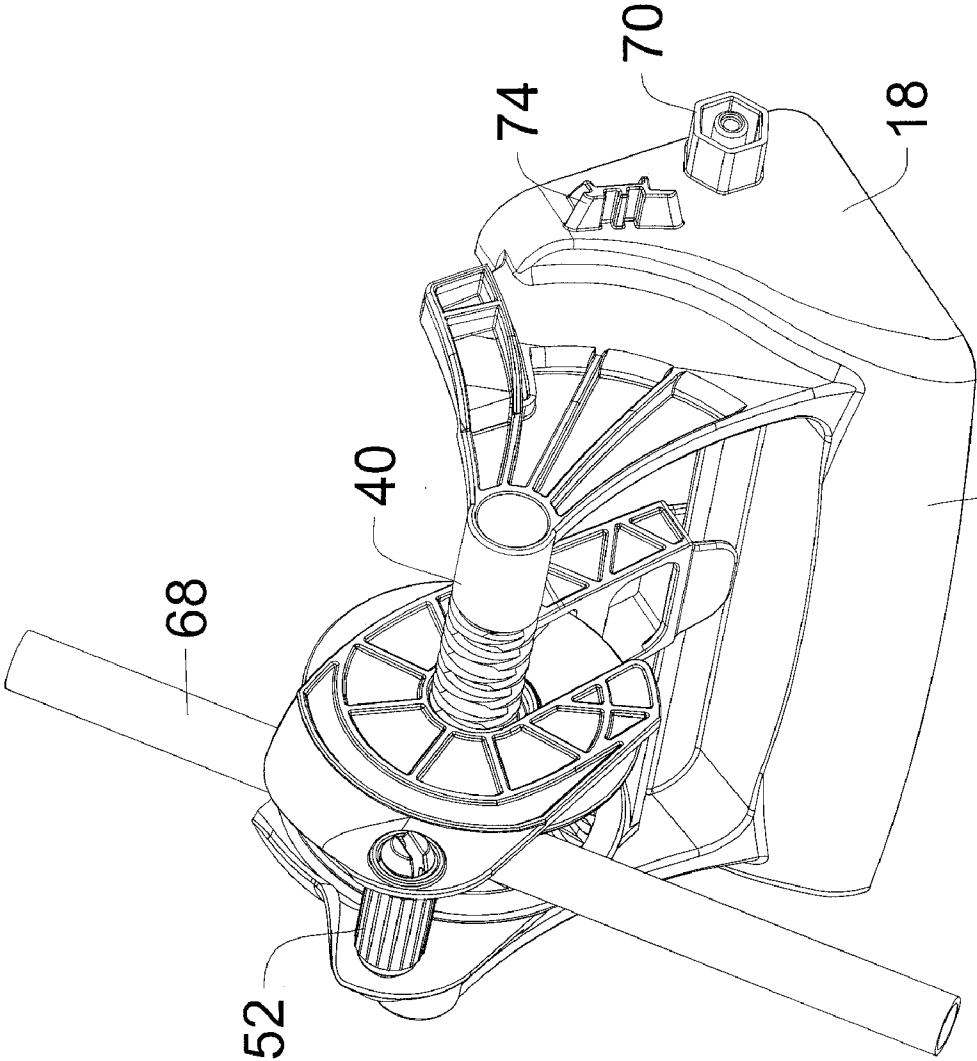


Fig. 5

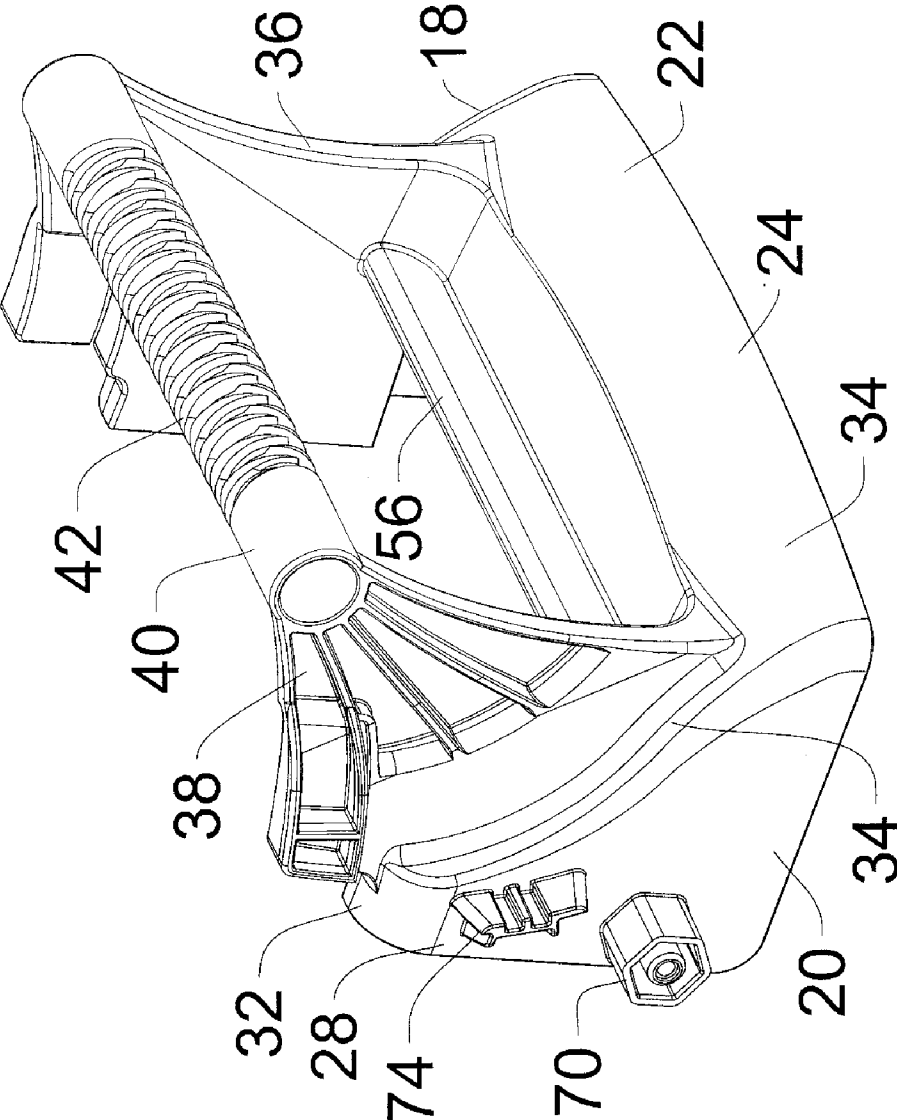


Fig. 6

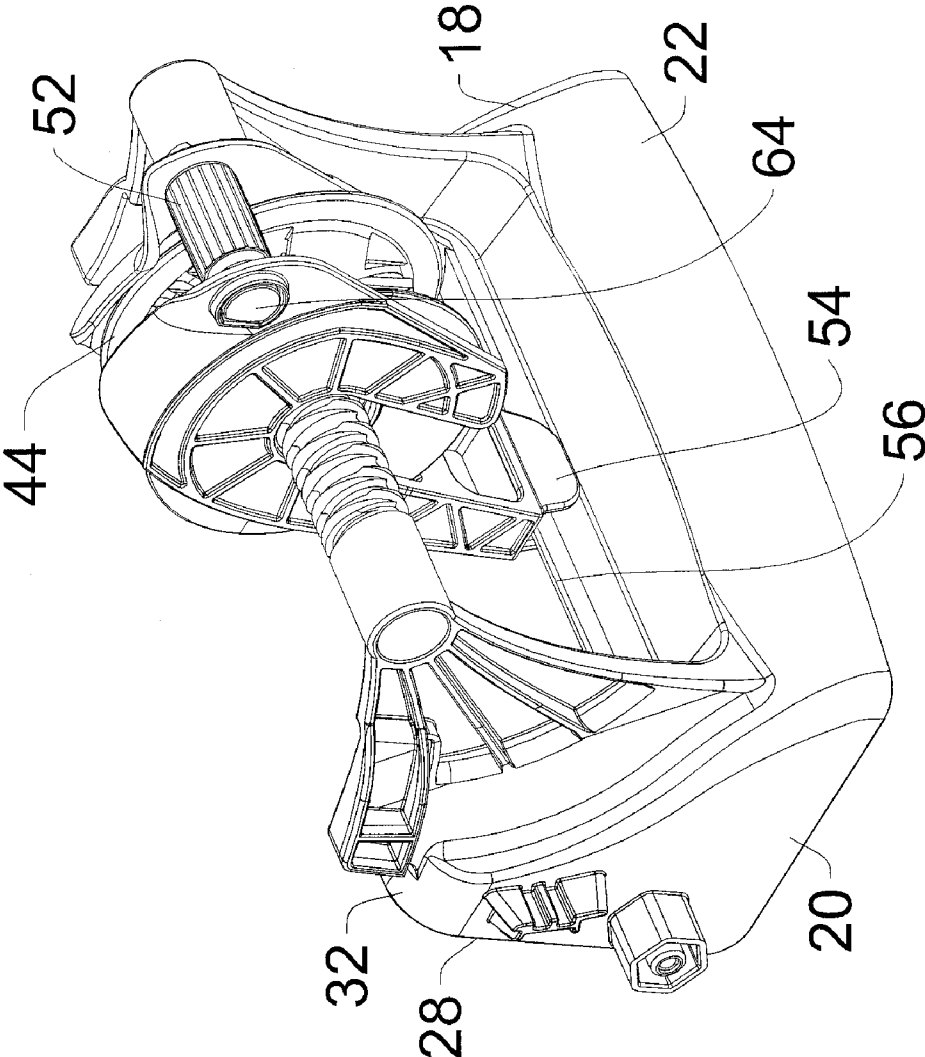


Fig. 7

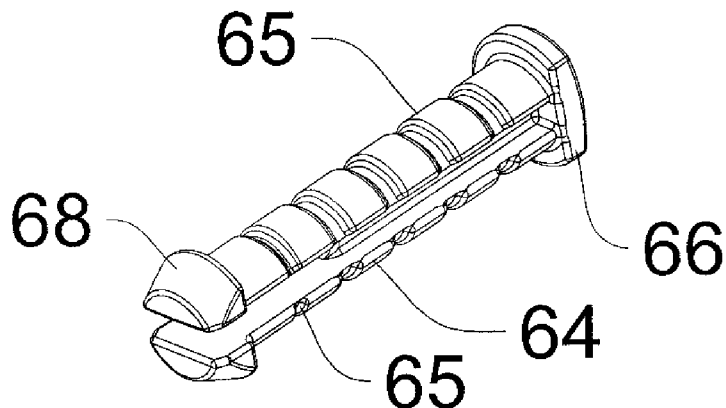


Fig. 8A

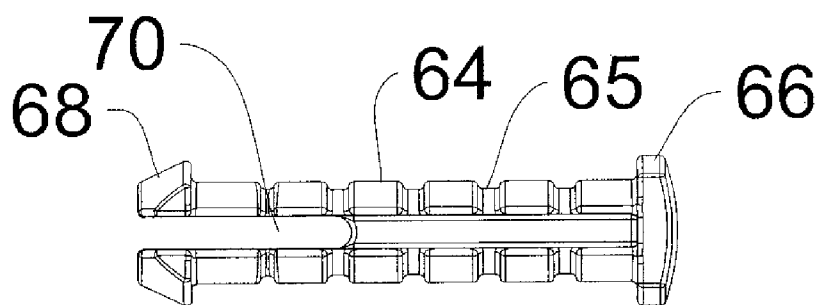


Fig. 8B

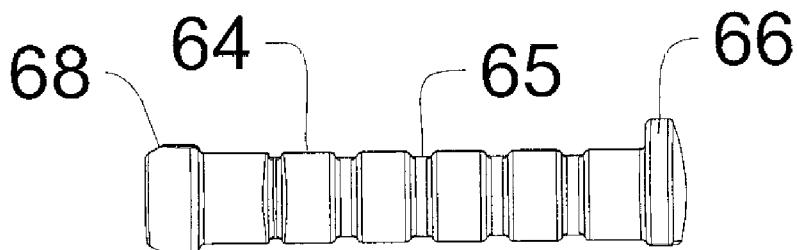


Fig. 8C

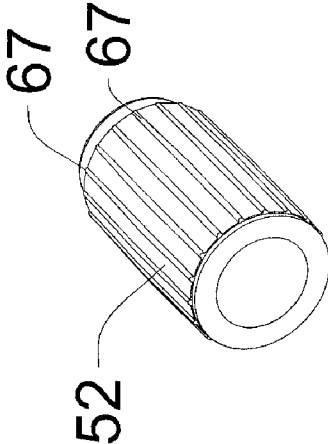


Fig. 9A

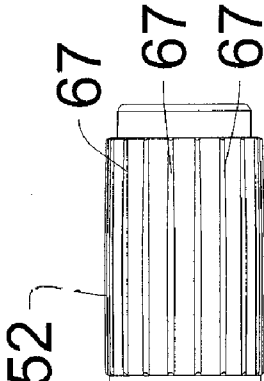


Fig. 9B

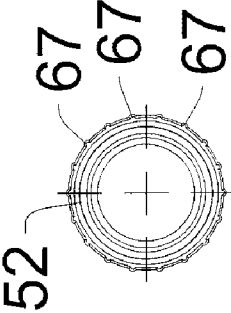


Fig. 9C

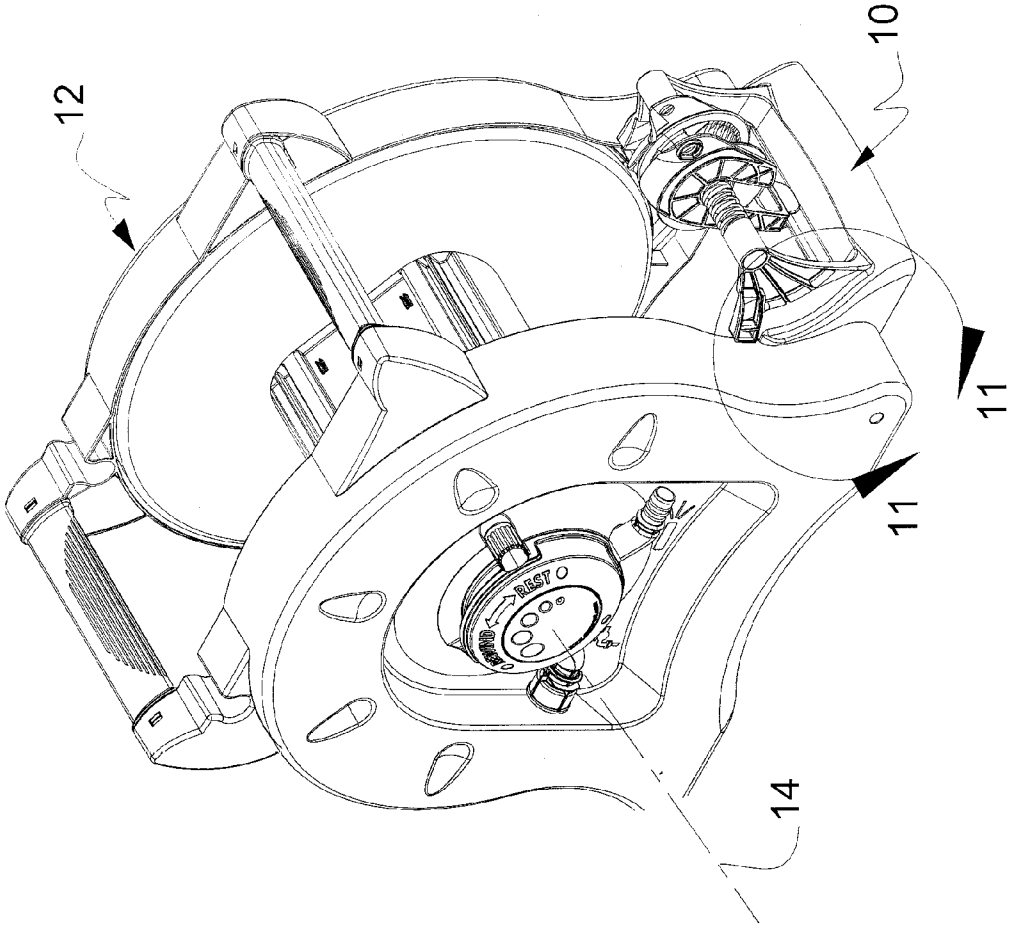


Fig. 10

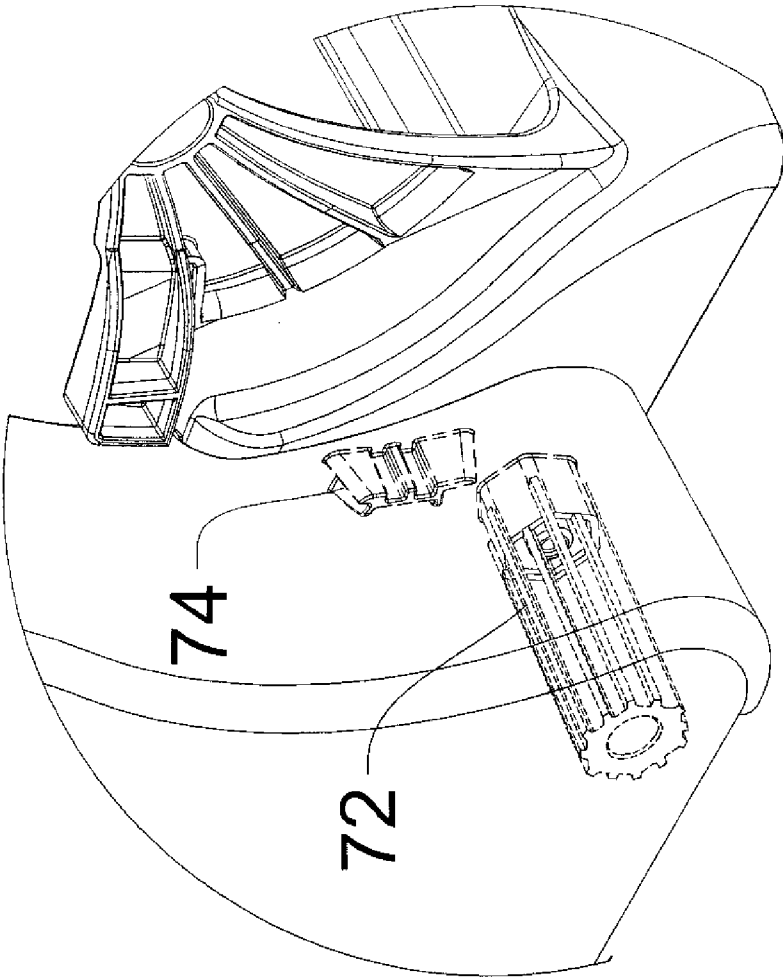


Fig. 11

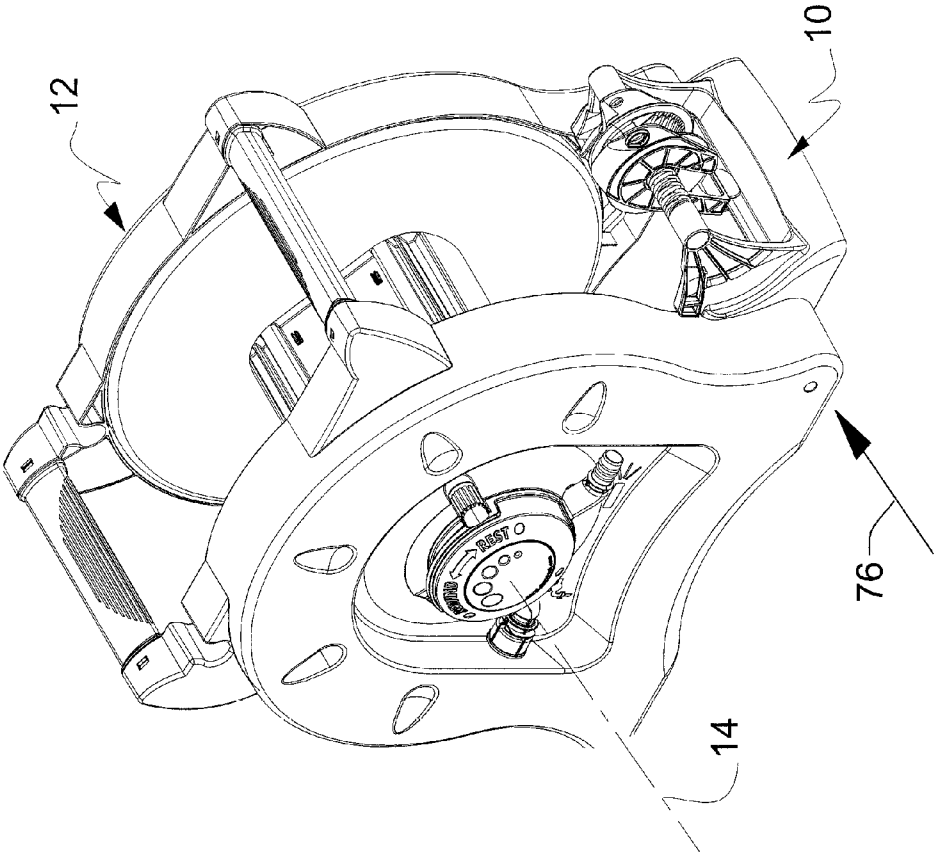


Fig. 12

GEARLESS HOSE TRACKING ASSEMBLY FOR HOSE REEL APPLICATIONS

FIELD OF THE INVENTION

[0001] This invention relates generally to guiding mechanisms and, more particularly, to a hose tracking assembly having a guide member adapted to reciprocate across a double helix groove provided about a static shaft, the guide member being driven by the friction of the hose being pulled onto the reel.

BACKGROUND OF THE INVENTION

[0002] The use of hose reels for conventional handling and storage of flexible garden hoses has gained wide public acceptance. Such hose reels can be mounted on a cart or secured to the wall and are primarily constructed of molded plastic components. Various hose reel assemblies for storing garden hoses are known in the art. For example, U.S. Pat. No. 4,506,698, assigned to the assignee of the instant invention, discloses a wall mounted hose storage apparatus. U.S. Pat. No. 4,512,361, assigned to the assignee of the instant invention, discloses a hose reel apparatus on a wheeled cart. U.S. Pat. No. 6,050,291, assigned to the assignee of the instant invention, discloses a rotatable reel within an enclosure.

[0003] A drawback associated with these devices is that they are not equipped with a hose tracking assembly to guide the hose member evenly as it is taken up on the spool. The lack of a hose tracker generally causes the hose to be distributed unevenly across the spool. This condition is exacerbated if the garden hose is not substantially perpendicular to the reel's axis of rotation when being wound onto the spool, creating a tendency for the garden hose to pile up on one end of the spool and not evenly distribute itself along the length of the spool.

[0004] U.S. Pat. No. 5,404,900, assigned to the assignee of the instant invention, recognized the drawback of unevenly wound hose and provides a hose reel with a hose tracker mechanism. A spool is mounted within a housing and configured to be rotated by a handle, a tracker shaft having a double helix thread pattern is also rotatably mounted within the housing and configured to rotate with the spool. A guide bracket moves along the tracker shaft which makes a saddle-like arrangement for the garden hose to ride in for correct positioning of the hose to be wound onto the spool. The device allows the hose to be evenly wound onto the spool in successive layers. However, even winding requires rotation of the tracker screw to reciprocate the guide bracket. Rotation of the tracker screw requires a gear train or belt for timed operation in conjunction with the spool member.

[0005] German Patent Publication DE 103 00 960 discloses a device for winding and unwinding a garden hose. The device includes a drum, which is rotated by a handle. A shaft having a double helix groove is mounted a spaced distance from the drum. A wheel having a groove sized to accept the hose member rotates about the shaft as the hose is pulled onto the drum. A rod extends parallel to the shaft to prevent the hose member from jumping off of the wheel when the hose is pulled from angle that is not perpendicular to the drum. However, the positioning of the rod requires the hose to be pulled into the reel from a steep downward angle to create sufficient friction between the wheel and the hose to cause the wheel to rotate. Pulling the hose in at a lesser angle creates a lesser amount of friction between the rod and the hose member.

[0006] U.S. Published Patent Application No. 2007/0241224, assigned to the assignee of the instant invention, discloses a system for evenly winding a hose on a reel. The device includes a static shaft, a pulley, a pulley housing, and a spring loaded mechanism configured for engaging the hose with the pulley. The pulley is adapted to move along the shaft, in an oscillatory motion in response to spooling of the hose. The mechanism configured for engaging the hose with the pulley is attached to the pulley housing at a position substantially perpendicular to the pulley's axis of rotation and further configured to roll over a surface of the hose which pushes the hose against the pulley. However, it has been found that the perpendicular relationship between the rotatable rod and the pulley creates very minimal contact between the surface of the hose and the pulley and is subject to "jumping" or skipping on the pulley, also the portion of the hose about to enter the pulley, which is not in contact with the pulley or rotatable rod, is subject to flailing.

[0007] U.S. Published Patent Application No. 2006/0054731 discloses a system for winding a hose onto a hose reel. The system includes a spring operated device for pressing the hose onto a pulley 58. The pulley moves along a shaft to move the hose back and forth as it winds onto the reel.

[0008] The only point of contact between the pulley and the hose is perpendicular to the pulley's axis of rotation where the rotatable rod presses the hose against the pulley. By maintaining greater contact between a greater portion of the hose and the pulley, the hose is not subject to "jumping" or skipping or flailing on the pulley as the hose is moved there-through. A delicate balance between maintaining sufficient surface contact between a greater portion of the hose and pulley is warranted. Also, not creating unnecessary frictional force on the static shaft thus impeding the movement of the pulley along the shaft is needed.

[0009] Thus what is needed in the art is a device that allows a hose to be wound evenly on a hose reel using a guide wheel, positioned substantially perpendicular to a reel and translated along a static shaft by a moving hose, and a tracker body, having a roller assembly positioned offset the axis of rotation of the guide wheel to provide greater surface contact between the guide wheel and the hose. The guide wheel is driven by friction of the moving hose about the guide wheel which rotatably translates the guide wheel along a shaft from end to end. The tracker body is equipped with a roller assembly positioned offset the axis of rotation of the guide wheel and defines a passage for the entry of a hose to ensure that the hose does not "jump" or skip off the guide wheel.

SUMMARY OF THE INVENTION

[0010] The instant invention provides a hose reel guide device including a base, a housing structure, a static shaft, a guide wheel, a tracker body, and a roller assembly. The base includes a housing structure pivotally mounted thereon. The static shaft is mounted on the housing structure. The static shaft includes a first and second set of threads moving in opposite directions from one end on the static shaft to an opposite end on the static shaft. The guide wheel is adapted to circumferentially engage a portion of the static shaft and also adapted to receive a garden hose. The guide wheel includes a plurality of threads that cooperatively engage one set of threads on the static shaft. The guide wheel configured to oscillate about the static shaft as the guide wheel translates from one end on the static shaft to opposite end, when a moving garden hose passes therethrough. The tracker body is

mounted on the guide wheel. The tracker body has a channel adapted to receive a portion of the garden hose and configured to cooperatively moving along the shaft with the guide wheel when a moving garden hose passes therethrough the guide wheel and tracker body. The roller assembly is assembled on the tracker body and is positioned offset the axis of rotation of the guide wheel. The roller assembly assists in reeling the garden hose through the guide wheel and the tracker body. The roller assembly maintains sufficient surface contact between the garden hose and the guide wheel while producing negligible drag on the garden hose.

[0011] The roller assembly is assembled on the tracker body above the guide wheel. The roller assembly comprises of a pin and a roller. The roller is held in place between the walls of the tracker body and the pin is inserted through the tracker body apertures and the roller's center opening, whereby the chamfered ends of the pin are fastened to the outside surface of the tracker body's apertures. The roller rotates about the pin and the roller's axis of rotation is congruent with the pin's horizontal centerline. The roller assembly is positioned offset the axis of rotation of the guide wheel whereby the garden hose maintains sufficient surface contact with the guide wheel. The greater the surface contact between the hose and the guide wheel the less opportunity for the hose to "jump" or skip or flail on the guide wheel as is apparent with U.S. Publication No. 2007/0241224.

[0012] Accordingly, it is an objective of the present invention to provide a hose reel guide device including a tracker body and guide wheel, the guide moves back and forth along and on a shaft. A garden hose passes through the hose reel guide and onto the hose resulting in a uniformly and smoothly wrapped hose on a hose drum which also provides a compact storage configuration.

[0013] It is another objective of the present invention to provide a hose reel guide device which is easy to assemble and secure to a hose drum.

[0014] It is yet another objective of the present invention to provide a hose reel guide device made of polymeric components which are both lightweight and durable.

[0015] It is still yet another objective of the present invention to provide a hose reel guide device that includes a pivotable housing structure secured to the base of a hose reel which spools a hose onto or off of the hose reel in a substantially perpendicular direction from the axis of the hose reel.

[0016] It is a further objective of the present invention to provide a hose reel guide device having improved surface contact between a guide wheel and a hose by positioning a roller assembly offset from the axis of rotation of the guide wheel. The roller assembly allows for a greater portion of the hose to make surface contact with the guide wheel.

[0017] It is yet a further objective of the present invention to provide a hose reel guide device having a roller assembly including a roller with an outer surface which including grooves that grip the hose as it passes through the tracker body to facilitate passage of the hose through the guide wheel.

[0018] It is also another objective of the present invention to provide a hose reel guide device which includes a roller assembly that provides constant contact between a garden hose and a guide wheel to ensure that the moving garden hose provides the force for moving the tracker body and the guide wheel back and forth along a shaft.

[0019] Other objects and advantages of this invention will become apparent from the following description taken in conjunction with any accompanying drawings wherein are set

forth, by way of illustration and example, certain embodiments of this invention. Any drawings contained herein constitute a part of this specification and include exemplary embodiments of the present invention and illustrate various objects and features thereof.

BRIEF DESCRIPTION OF THE FIGURES

[0020] FIG. 1 is an exploded view of the hose reel guide device of the present invention;

[0021] FIG. 2 is a front perspective view of the hose reel guide device of the present invention without a pin;

[0022] FIG. 3 is a front perspective view the hose reel guide of the present invention including a hose;

[0023] FIG. 4 is a front perspective view the hose reel guide of the present invention including a first pin;

[0024] FIG. 5 is a front perspective view of the invention in FIG. 4 with the pin installed;

[0025] FIG. 6 is a front perspective view of the present invention without the hose reel guide;

[0026] FIG. 7 is a front perspective view of the hose reel guide of the present invention including a roller;

[0027] FIGS. 8 A-C are views of the pin used in conjunction with the hose reel guide of the present invention;

[0028] FIGS. 9 A-C are views of the roller used in conjunction with the hose reel guide of the present invention;

[0029] FIG. 10 is a front perspective view of the present invention used in conjunction with a hose reel;

[0030] FIG. 11 is a section along line 11-11 in FIG. 10; and

[0031] FIG. 12 is a front perspective view of the present invention used in conjunction with a hose reel.

DETAILED DESCRIPTION OF THE INVENTION

[0032] While the present invention is susceptible of embodiment in various forms, there is shown in the drawings and will hereinafter be described a presently preferred, albeit not limiting, embodiment with the understanding that the present disclosure is to be considered an exemplification of the present invention and is not intended to limit the invention to the specific embodiments illustrated.

[0033] Referring now to FIGS. 1-12, a gear-less tracking assembly 10 and its components will be now be described. In a preferred embodiment the tracking assembly 10 is employed in conjunction with a hose reel. FIGS. 10 and 12 illustrate the present invention used in conjunction with a hose reel. In the preferred embodiment the tracking assembly 10 is secured to the front lower portion of a hose reel 12. A hose, not illustrated, is wound onto and removed from the hose reel 12. When the hose is wound onto the reel 12 the tracking assembly 10 moves the hose back and forth along the axis 14 of the hose reel 12. This enables a hose to be evenly wound onto the hose reel 12 without piling up in one or more areas along the axis of the hose reel. This also enables a greater length of hose to be wound onto a hose reel. In addition, this prevents a hose from piling up along one portion of the hose reel which in turn makes it more difficult to wind the hose onto the hose reel and consequently unwind the hose from the hose reel.

[0034] FIGS. 1-7 illustrated the different components which comprise the tracking assembly. A base or front gate 16 includes two side walls 18 and 20. A front wall 22 extends between the two side walls 18 and 20. A bottom wall 24 extends between the side walls and is also secured to the front wall 22. The bottom wall 24 can be excluded in a different

embodiment. The bottom wall can be formed from a single or multiple members. A plurality of back walls 26, 28 are secured to the side walls and bottom wall. The back walls 26, 28 extend upwardly to the top walls 30, 32 of the base.

[0035] A front surface 34 extends between both side 18, 20 walls, the top walls 30, 32 and the front walls 22. Two support ribs 36, 38 are secured to the front surface 34 proximate the side walls. A shaft 40 is secured between the support ribs 36, 38. A double helix 42 is formed along the shaft 40.

[0036] A hose guide wheel 44 is formed of two half wheels 46 and 48. The two half wheels are secured together such that they can be readily disassembled. The inner circumference of the guide wheel 44 includes a plurality of grooves which provide for increased gripping of a hose by the guide wheel. A gear follower 50 is positioned within an inner axial portion of the hose guide wheel. The gear follower is resiliently biased into engagement with the double helix, whereby as the guide wheel 44 rotates the gear follower 50 engages the double helix and moves the guide wheel back and forth along the shaft 40. The spring bias permits the gear follower 50 to be disengaged from the double helix 42, by an operator pulling the gear follower away from the double helix or by other means. When the gear follow is not engaged with the double helix 42 the guide wheel can be readily moved along the shaft 40 without rotating the guided wheel. Thus the guide wheel can be readily repositioned anywhere along the shaft 40.

[0037] The guide wheel 44 is positioned within a tracker body 52, as illustrated in FIGS. 2-5 and 7. The tracker body 52 includes a guide member 54 which engages a rail 56 positioned on the tracker assembly. The guide member 54 includes two flanges 58 and 60. These flanges engage the rail 56 and permit the tracker body to move in a direction along the axle 40. They also prevent the tracker body 52 from rotating around the shaft 40. The upper portion of the tracker body 52 includes surfaces which extend laterally inwardly toward each other. These surfaces 53 assist in keeping a hose in contact with the tracker assembly.

[0038] A roller 62 is positioned within an upper portion of the tracker body 52 between side walls of the tracker body, as shown in FIGS. 4, 5, 10 and 12. A pin 64 extends through the hollow central portion of the roller 62. One end 66 of pin 64 is larger in diameter than the pin whereby end 64 engages a hole in a sidewall of the tracker body and prevents the pin from passing completely through the tracker body and the roller. End 66 is also preferably D-shaped to act as a catch in the tracker body and to properly align and prevent excessive rotation of the pin 64. Another end 68 of the pin is formed from two flanges which are constructed and arranged to be compressed so as to pass through the roller and a side wall on the tracker body and also be expanded to engage the side wall of the tracker body to prevent movement of the pin along its axis. This construction also secured the roller 52 onto the tracker body while permitting the roller to rotate about its axis. In a preferred embodiment one end portion of pin 64 has a slot 70. Slot 70 permits the end portion 68 of the pin to be compressed whereby the end portion 68 can pass through the center of the roller 52 and the sidewall of the tracker body. After end portion 68 passes through the sidewall of the tracker body the end portion 68 of pin expands outwardly in a radial direction such that end portion 68 engages the side wall of the tracker body keeping the pin and roller within the tracker body. The longitudinal portion of pin 64 located between the ends can be provided with grooves 65. These grooves help to reduce friction of the surface of the longitudinal portion of pin

64 when pin 64 and roller 52 are mated together. The longitudinal portion of pin 64 acts as a bearing surface.

[0039] Roller 52 is illustrated in FIGS. 9 A-C. Roller 52 preferably includes a plurality of raised ribs 66 spaced around the outer circumference of the roller. The ribs 66 enhance the contact between the roller and a hose 68 such that there is limited slippage between the roller and the hose. The roller is also offset in a lateral direction from a vertical axis of the axle 40. This offset is illustrated in FIGS. 4 and 5. Further the distance between the outer surface of the roller and the inner surface of the guide wheel is preferably less than the diameter of the hose which is being wound onto the hose reel. The combination of this distance and the offset of the roller in a lateral direction from the vertical axis of shaft 40 provides a unique relationship which limits virtually any slipping between the hose 68 and the guide wheel. The relationship ensures that the guide wheel will continually rotate and move the hose guide back and forth along the shaft 40. This ensured that the hose 69 is wound evenly onto the hose reel.

[0040] One of the devices that the gear-less tracking assembly can be used with is a hose reel. This combination is illustrated in FIGS. 10-12. Pivoting hinges or members 70 are secured to each of the side walls 18. Each of the pivoting hinges cooperate with respective pivot receivers 72, illustrated in FIG. 11, which are mounted on an inner lower portion of a hose reel. Stop ribs 74 are also mounted on the side walls 18. The stop ribs 74 cooperate with an inner surface of the hose reel to help secure the tracker assembly to the hose reel. As illustrated in FIG. 12, a fastener 76, such as a screw or bolt, can also be used to secure the tracker assembly to the hose reel.

[0041] In addition to being used in conjunction with a hose and a hose reel the tracker assembly 10 can be employed with any flexible cable, hose or elongate member to assist the placement of the cable, hose or elongate member onto a reel. The tracker assembly also assists in the removal of the cable, hose or elongate member from the reel.

[0042] All patents and publications mentioned in this specification are indicative of the levels of those skilled in the art to which the invention pertains. All patents and publications are herein incorporated by reference to the same extent as if each individual publication was specifically and individually indicated to be incorporated by reference.

[0043] It is to be understood that while a certain form of the invention is illustrated, it is not to be limited to the specific form or arrangement herein described and shown. It will be apparent to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown and described in the specification and any drawings/figures included herein.

[0044] One skilled in the art will readily appreciate that the present invention is well adapted to carry out the objectives and obtain the ends and advantages mentioned, as well as those inherent therein. The embodiments, methods, procedures and techniques described herein are presently representative of the preferred embodiments, are intended to be exemplary and are not intended as limitations on the scope. Changes therein and other uses will occur to those skilled in the art which are encompassed within the spirit of the invention and are defined by the scope of the appended claims. Although the invention has been described in connection with specific preferred embodiments, it should be understood that the invention as claimed should not be unduly limited to such

specific embodiments. Indeed, various modifications of the described modes for carrying out the invention which are obvious to those skilled in the art are intended to be within the scope of the following claims.

What is claimed is:

1. A gear-less tracking device comprising:
 - a tracking assembly, said tracking assembly including an shaft mounted thereon;
 - a guide wheel mounted on said shaft;
 - a tracker body, said tracker body constructed and arranged to have said guide wheel secured within said tracker body, said guide wheel constructed and arranged to oscillate along said static shaft as said guide wheel rotates; and
 - a roller assembly secured to said tracker body vertically above said guide wheel, said roller spaced from said guide wheel to provide sufficient space for the passage of a hose between said roller assembly and said guide wheel, whereby said roller assembly assists in reeling a hose through said guide wheel and said tracker body and maintains and engages frictional contact between a hose and said guide wheel.
2. The gear-less tracking device of claim 1, wherein said roller assembly comprises:
 - a pin having a central axis and opposite ends, one end of said pin end being radically inwardly compressible, each end of said pin cooperating with said tracker body to secure said roller assembly to said tracker body; and
 - a roller having a central bore and an outer surface, said central bore defining a passage, said pin constructed and arranged to extend through said passage.
3. The gear-less tracking device of claim 2, wherein said roller includes an outer surface, a plurality of ribs secured to said outer surface of said roller, said ribs extend in a longitudinal direction along said outer surface.

4. The gear-less tracking device of claim 1, wherein said tracker body also includes opposing apertures for receipt of said roller assembly.

5. The gear-less tracking device of claim 4, wherein one end portion of said pin is compressible whereby said pin can be compressed and passed through said aperture on said tracker body and through said central bore on said roller.

6. The gear-less tracking device of claim 1, wherein said guide wheel is annular and includes an inner surface and an outer surface, said inner surface defining a passage for engaging said shaft, said outer surface includes a plurality of grooves which are constructed and arranged to receive a hose.

7. The gear-less tracking device of claim 6, wherein said guide wheel includes two portions removably attached to each other.

8. The gear-less tracking device of claim 7, wherein said inner surface of said guide wheel cooperates with a gear follower to move said guide wheel and tracker body back and forth along said shaft.

9. The gear-less tracking device of claim 8, wherein said shaft includes a first and a second set of threads on said static shaft, said first and said second set of threads extend in a clockwise and counter clockwise direction respectively.

10. The gear-less tracking device of claim 6, wherein said outer surface of said guide wheel includes substantially parallel sidewalls extending outwardly and perpendicularly from and axis of said guide wheel, a height of each said parallel sidewall being sufficient to confine a hose and define a passage for a hose.

11. The gear-less tracking device according to claim 1, wherein said tracking assembly includes at least two connectors constructed and arranged for connection of said gear-less tracking device to hose reel.

12. The gear-less tracking device of claim 11, wherein said tracking assembly is substantially parallel to a hose reel's axis of rotation.

* * * * *