Sept. 16, 1969 R. T. BECKER ETAL 3,467,134

DUAL HYDRAULIC REEL

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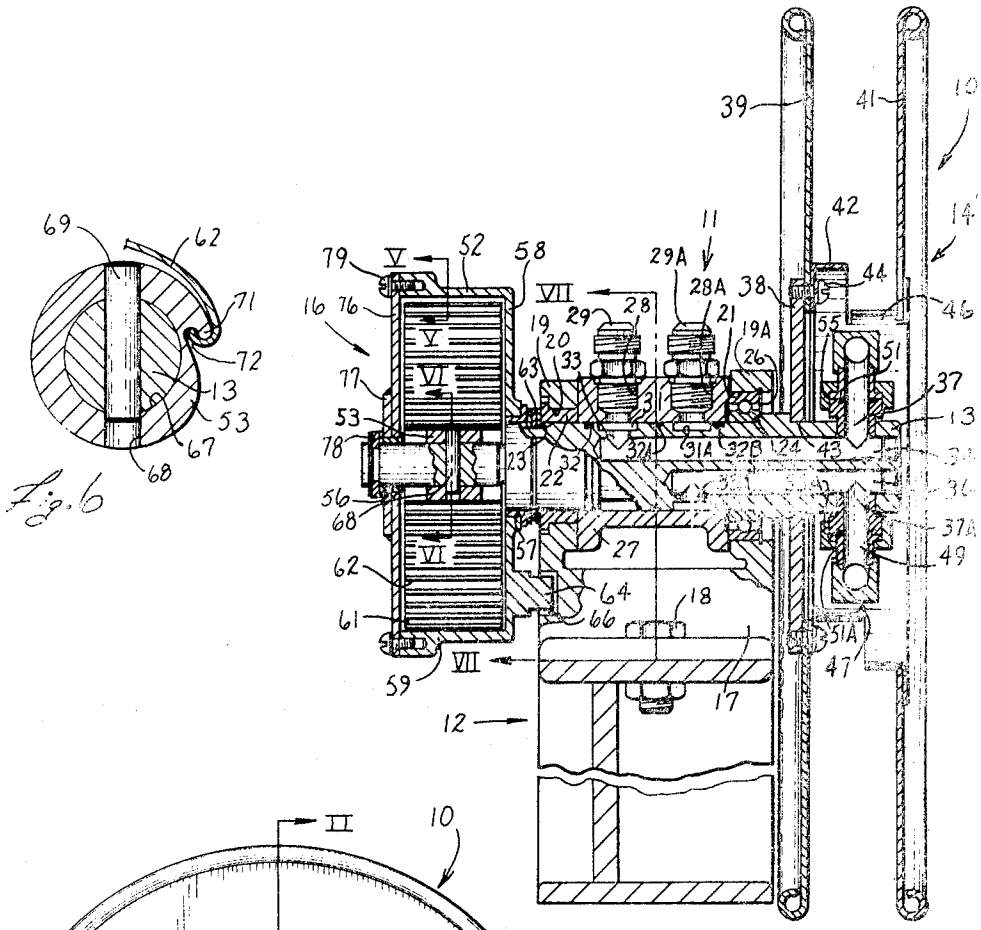


Fig. 2

Fig. 6

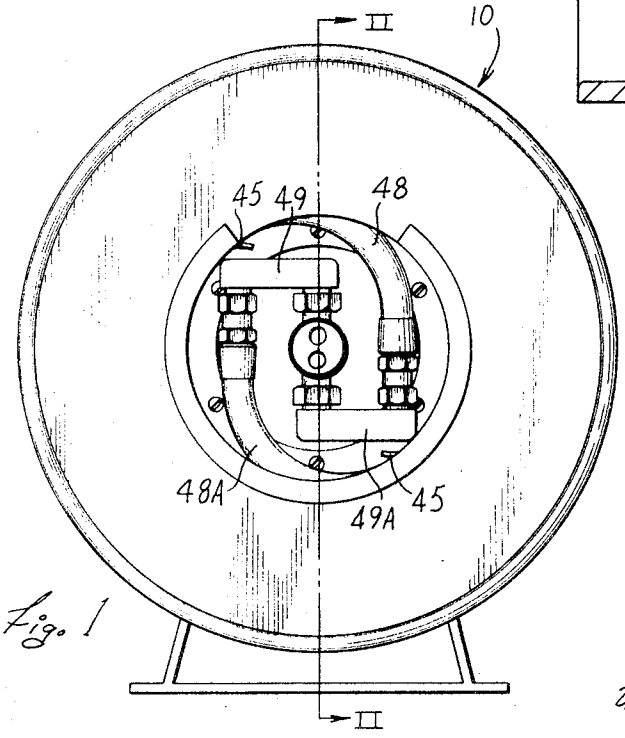


Fig. 1

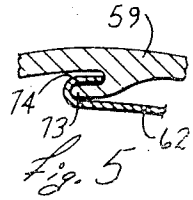


Fig. 5

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DUAL HYDRAULIC REEL

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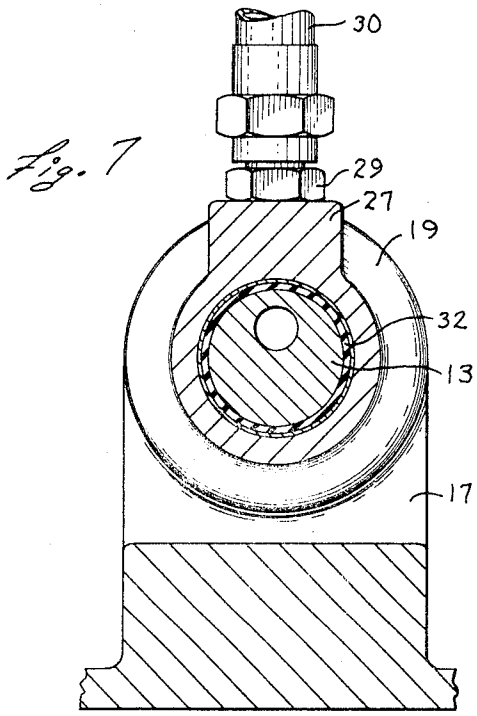


Fig. 7

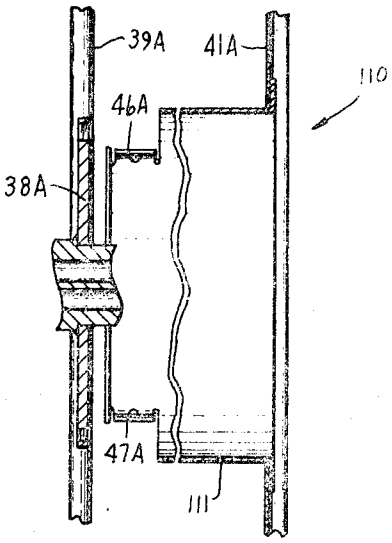


Fig. 4

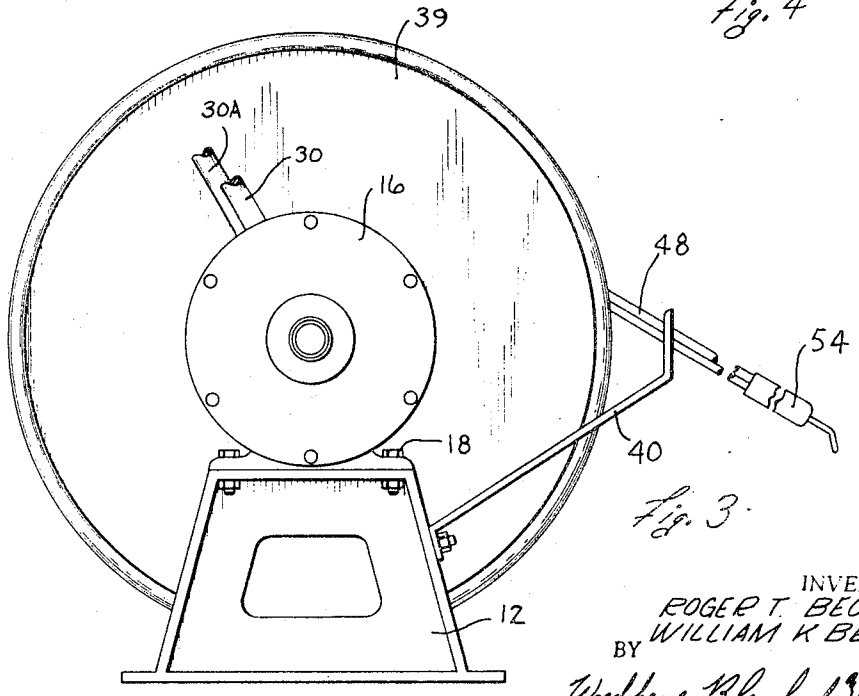


Fig. 3.

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DUAL HYDRAULIC REEL

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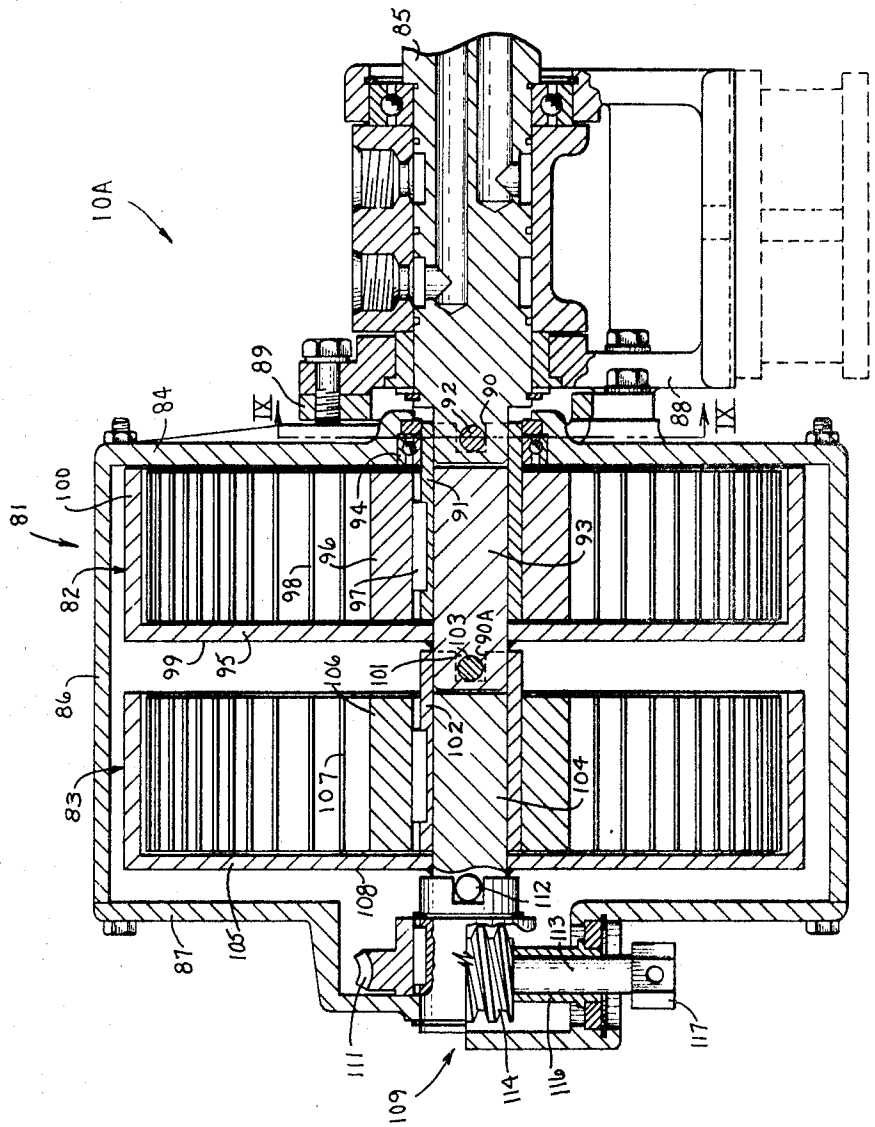


Fig. 8

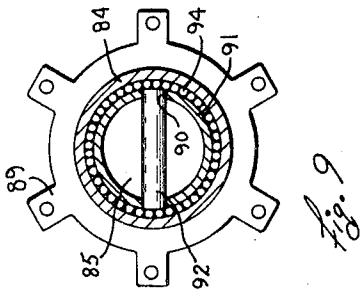


Fig. 9

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DUAL HYDRAULIC REEL

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Int. Cl. B65h 75/46, 75/48
U.S. Cl. 137—355.17 6 Claims

ABSTRACT OF THE DISCLOSURE

The hose reel assembly comprises reel drum means connected to spring motor means for opposing rotation of said drum means in an unwinding direction. A pair of hoses are wound upon the drum means and connected through a pivotable seal on the reel assembly to a pair of pressure fluid sources.

There are numerous occasions where it is necessary to conduct two types of pressurized fluid from a source thereof to a single zone or point of discharge spaced a variable distance from said sources. For example, in certain types of welding operations, it is commonplace to conduct under pressure two types of gas from sources of such gas to a nozzle at which the gases are mixed and ignited. In some instances, the sources of said gas may be relatively close to the point at which the ignited mixture will be used In other instances, the use may be required at a very substantial distance from the source. Thus, it is very desirable to have means, such as a reel assembly, for storing the excess hose not required to reach the point of use in any given instance.

In previous structures, intended for this general purpose, the hoses or the like for connecting the source to the reel assembly have generally been rigidly connected in a substantially fixed position to the supporting frame structure of the reel assembly. Accordingly, in certain positions of the reel assembly with respect to the source, the hoses could become pinched or at least exposed to unnecessary strains which would tend to shorten their useful life.

Furthermore, existing reel assemblies of this type often encounter severe leakage problems unless they are provided with complicated and expensive sealing mechanisms, which require frequent attention and adjustment.

Accordingly, the objects and purposes of this invention have been to provide a hose reel assembly capable of supporting a pair of hoses and having fluid conducting passageways therethrough for connecting said hoses to a pair of pressure fluid sources so that leakage of said fluid from within said reel assembly is minimized and the position of said sources can be readily changed with respect to the reel assembly without imposing stress upon the hose connections therebetween, all of which is accomplished by a relatively simple and inexpensive construction.

A further object of this invention has been the provision of a reel assembly, as aforesaid, adapted for use with a spring motor capable of being pretensioned and easily disconnected from the reel assembly for replacement, said spring motor being of thetype which can be coupled in series with other similar motors for increasing the amount of unwinding movement of the drum of the reel assembly.

Other objects and purposes of this invention will become apparent to persons acquainted with this type of equipment upon reading the following descriptive material and examining the accompanying drawings, in which:

FIGURE 1 is an end view of the hose reel assembly.

FIGURE 2 is a broken, cross-sectional view taken along the line II—II in FIGURE 1.

FIGURE 3 is a view of the opposite end of the hose reel assembly appearing in FIGURE 1.

FIGURE 4 is an enlarged, broken fragment of FIGURE 2 showing an alternate type of drum.

FIGURE 5 is a fragmentary sectional view taken along the line V—V in FIGURE 2.

FIGURE 6 is a fragmentary sectional view taken along the line VI—VI in FIGURE 2.

FIGURE 7 is a cross-sectional view substantially as taken along the line VII—VII in FIGURE 2.

FIGURE 8 is a fragment of a central cross-sectional view of a hose reel assembly, illustrating an alternate spring motor means.

FIGURE 9 is an adapter plate for connecting the alternate spring motor means to the journal box.

General construction

The objects and purposes of the invention, including those set forth above, have been met by the provision of a hose reel assembly comprised of a journal box mounted on a base and rotatably supporting a shaft. A central portion of the journal box, to which inlet hoses are connected, is mounted on said shaft and is rotatable with respect to said shaft and said base, so that said inlet hoses can extend in the radial direction of least resistance and thereby minimize the forces exerted on the hoses. A drum, on which a pair of hoses are wound, is mounted on one end of the shaft and a spring motor for retrieving the hose is connected to the opposite end. The spring motor may be pretensioned by rotating said motor after it has been secured to the shaft but prior to securing the housing of the motor to the base.

Detailed description

The hose reel assembly **10**, of which FIGURE 2 illustrates a preferred embodiment, is comprised of a journal box **11** mounted on a base **12** and a shaft **13** rotatably mounted in said journal box and extending beyond each end thereof. A drum **14** is mounted on one end of said shaft and a spring motor **16** is mounted on the opposite end of said shaft.

The journal box **11** (FIGURE 2) has a lower portion **17** which is mounted onto base **12** by bolt **18**. Said journal box also has spaced, upwardly extending end portions **19** and **19A** with coaxial bores **20** and **21**, respectively, in which suitable bearings **22** and **24** are mounted. The size of such bores will depend upon the size and type of bearings to be used.

In the preferred embodiment (FIGURE 2) a sleeve bearing **22** is mounted in the bore **20** adjacent the spring motor **16** and is held in place by a retainer ring **23**. It may be desirable to replace sleeve bearing **22** with a ball or roller type bearing, should a larger or heavier spring motor be used.

A ball bearing **24** is secured in the opposite bore **21** by retainer ring **26**, the outer race of said bearing being securely engaged with the outer wall of the bore **21**. The inner diameters of bearings **22** and **24** should be such that shaft **13** is received therein for rotation. The journal box **11**, base **12** and collar **27** may be cast of a suitable material, such as iron. The base **12** may be mounted permanently upon a floor or it may be desirable to mount said hose reel assembly upon a vehicle of some type, such as a truck.

The center portion **27** of journal box **11** comprises a collar which is mounted on shaft **13** between the upwardly extending end portions **19** and **19A** and is rotatable both in respect to said shaft and said box. Collar **27** has a pair of radially disposed inlet passageways **28** and **28A** which are threaded for reception of nipples **29** and **29A**. Inlet conduits **30** and **30A** (FIGURE 3) are connected to the nipples **29** and **29A**, respectively, (FIGURE 2) and are connectible to two sources of pressure fluid, not shown.

Said passageways lead into annular grooves **31** and **31A**, which may be recessed into the shaft, recessed in said collar or partially located in each. Annular seals **32**, **32A** and **32B** are provided adjacent the annular grooves **31** and **31A** to prevent escape of pressure fluid along and between shaft **13** and collar **27**.

The shaft **13** is rotatably mounted in the bearings **22** and **24** and has a pair of radial openings **33** and **33A** which communicate between the annular grooves **31** and **31A**, and the lengthwise passageways **34** and **36**, respectively. Said lengthwise passageways extend to that end of the shaft **13** on which drum **14** is mounted where they communicate with a pair of radially disposed outlet openings **37** and **37A**. The various openings, grooves and passageways in the shaft **13** preferably have cross-sectional areas which approximate the cross-sectional areas of the pressure hoses to be used.

Drum **14** (FIGURE 2), which is secured to one end of shaft **13**, is comprised of a hub **38**, an inner flange **39**, an outer flange **41** and a circumferential wall **42**. Hub **38**, which is flat and circular in shape, has a coaxial hole **43** through which shaft **13** extends, and is fastened to shaft **13** by conventional means, such as welding. The inner flange **39** and circumferential wall **42** are secured to hub **38** by conventional means such as welding or screws **44** and the outer flange **41** may be similarly attached to wall **42**. The inner flange **39** and outer flange **41** may be circular in shape and the edges of same may be curled or blunted. The diameter of said flanges is designed in accordance with the amount of hose to be stored and said flanges may be made of a light gauge sheet metal. The inner and outer flanges **39** and **41** are illustrated as being parallel. However, it would be possible for them to be otherwise, such as outwardly diverging.

The circumferential wall **42** has a pair of openings **46** and **47** (FIGURE 2) through which a pair of hoses **48** and **48A** extend, as hereinafter discussed. The design of the circumferential wall **42** may vary somewhat, but its cross section is preferably substantially circular, and it has integral, inwardly extending flaps **45** at the edges of the openings **46** and **47** where the hoses **48** and **48A** exit. In FIGURE 2 said wall **42** is rather narrow and said hoses **48** and **48A** exit the drum in separate vertical planes. The alternate drum **110** (FIGURE 4) has a rather wide circumferential wall **111** and the hoses exit in the same vertical plane. Both arrangements have advantages.

Outlet fixtures **49** and **49A** (FIGURE 1) are connected in the openings **37** and **37A** in the shaft **13** and are attached to said fluid hoses **48** and **48A**. The outlet fixtures may be provided with swivel fittings, **55** and **55A** which, as shown in FIGURE 2, have seals **51** and **51A** to prevent escape of pressurized fluid. A hose guide and nozzle holder **40** (FIGURE 3) has a lower end attached to base **12** and an upper end adapted for guiding the hose **48** and holding the nozzle **54**.

The spring motor **16** (FIGURE 2) is disposed at the opposite end of shaft **13** from drum **14**, adjacent journal box **11**. Said motor is comprised of a spring casing **52**, a center sleeve **53** and a coil spring **62**. The spring casing **52** is rotatably mounted in relation to shaft **13**, such as on sleeve bearings **56** and **57**. The spring casing **52** has an inner side wall **58**, which is preferably integral with peripheral wall **59**, and an outer side wall **76**, said walls defining a chamber **61** in which spring **62** is housed. The center of side wall **58** has a thickened portion defining a concentric opening in which sleeve bearing **57** is mounted, said bearing being held in position by retainer ring **63**. Said casing **52** may be formed from any suitable material, such as metal or plastic, and may be held against rotation relative to base **12** by the integral post **64** which extends into the recess **66** (FIGURE 2) in the journal box **11**. Alternatively, said casing **52** may be bolted to said box **11**.

Sleeve **53** has a lengthwise bore **67** through which said shaft **13** may be slideably received after casing **52** is in place on said shaft. A hole **68** is provided transverse to and through shaft **13** and sleeve **53** for admission of pin **69** which locks said shaft and said sleeve together. Said sleeve has a hook **71** (FIGURE 6) which releasably interlocks with hook **72** on the inner end of spring **62**. A hook **73** (FIGURE 5) is provided on the inner surface of the peripheral wall **59** of casing **52**. Said hook **73** faces in the opposite circumferential direction from hook **72** for engagement with hook **74** on the outer end of spring **62**.

Spring **62**, as illustrated in the preferred embodiment, is of the coil type, the strength of which will depend upon the characteristics of the hose to be retrieved thereby.

The side wall **76** is removably secured to casing **52** by bolts **79** and has a reinforced central portion **77** which defines a concentric opening in which bearing **56** is held by retainer **78**.

Operation

Although the operation of the hose reel assembly **10** has been indicated above, the same will be specifically discussed. Two hoses **48** and **48A**, for carrying pressurized fluids, may be coiled upon drum **14**. The stored hose is unwound from the drum by grasping the hose near the nozzle **54** and pulling away from the assembly **10**. The rotating drum causes the shaft **13** to rotate and thereby tightens the spring **62** in a well-known manner, because the casing **52** is locked in relation to the non-rotating base **11**. When the tension on the hoses is released, the spring **62** causes shaft **13** and drum **14** to rotate in a winding direction whereby the hoses are wound onto said drum. The spring motor **16** may be pretensioned prior to being placed in locked engagement with base **11** to insure that the entire hose will be rolled onto said drum. The hose guide holds the nozzle for easy engagement, when said hose has been rolled onto drum **14**, and also prevents the continued rotation of said drum with the accompanying loss of spring tensioning.

A drum lock (not shown) of a conventional type may be provided between the drum **14** and base **11** to hold the drum **14** against rotation when substantially any amount of said hoses is unwound from the drum.

Because the collar **27** can rotate around the shaft **13**, inlet hoses **30** and **30A** can extend therefrom in any radial direction disposed within an arc of about 270 degrees, thereby avoiding sharp bends and providing adaptability to many uses.

Modification

The alternate spring motor **81** (FIGURE 8) provides for variations in the load capabilities of the reel assembly

10A to which it is connected. The construction of said motor 81 may be quite similar to that of motor 16 except that motor 81 has a pair of spring units 82 and 83 in place of the single spring 62 of motor 16. The motor 81 has an inner side wall 84, a peripheral wall 86 and an outer side wall 87. The side wall 84 of motor 81 is secured to the base portion 88 of the hose reel assembly 10A by an adapter plate 89.

The left end of the main shaft 85 is inserted a short distance within a sleeve 91. The right end of sleeve 91 has a slot 90, and a pin 92 extends through the shaft 85 for reception into the slot 90 whereby said shaft 85 is locked in relation to said sleeve 91. Sleeve 91 is rotatably mounted upon stub shaft 93 and within ball bearing 94, which is secured in locked engagement between the inner wall 84 and the collar 96. The sleeve 91 is secured to the collar 96 by key 97. A hook (not shown, but similar to hook 71 of FIGURE 6) on collar 96 engages the inner end of spring 98. The outer end of said spring 98 engages with a second hook (similar to hook 73 of FIGURE 5) connected to the peripheral wall 100 of the spring retainer 99. The side wall 95 of retainer 99 is in turn secured to stub shaft 93, as by welding near its left end.

The left end 101 of stub shaft 93 extends into sleeve 102 and is held for rotation therewith by pin 103 which extends into a slot 90A. Sleeve 102 is rotatable upon stub shaft 104 and is in locked engagement with collar 106. Spring 107 is connected between and to collar 106 and spring retainer 108 in a manner similar to spring 98. The left wall 105 of spring retainer 108 is locked to stub shaft 104. As is evident, any number of spring motor units 82 and 83 may in like manner be coupled together, thus varying the load capabilities of the spring motor 81.

A pretensioning device 109, as illustrated in FIGURE 8, is comprised of a worm gear 111 which is mounted upon the end of stub shaft 104 and connected thereto by pin 112. Shaft 113, on which is drivingly mounted a worm 114, is rotatably mounted, transverse to shaft 104, in a sleeve bearing 116 which is supported on side wall 87. Worm 114 is drivingly engaged with worm gear 111 so that when knob 117 is rotated, thus causing shaft 113 and worm 114 to rotate, gear 111 is rotated whereby the stub shaft 104 is rotated to pretension both springs in motor 81.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A hose reel assembly for connecting a pair of discharge hose means to a pair of supply hose means which are connected to source means, comprising:

base means including a journal box having a central sleeve portion rotatable with respect to said base means;

shaft means rotatably mounted on said base means and having a journal portion rotatably disposed within the central sleeve portion of said journal box;

motor means drivingly connected between said base means and said shaft means;

drum means mounted upon said shaft means for rotation thereby and for holding said discharge hose means;

means defining a pair of lengthwise passageways extending in said shaft means from points within said journal portion to points adjacent said drum means;

a pair of inlet passageway means extending substantially radially through said central sleeve portion of said journal box and said journal portion of said shaft means and communicating with said lengthwise passageways, said inlet passageway means including means on said central sleeve portion for connecting said pair of supply hose means to the inlet passageway means; and

a pair of outlet conduit means communicating with said lengthwise passageways near said drum means for connection to said pair of discharge hose means;

whereby the central sleeve portion is freely rotatable relative to said base means and relative to said shaft means for permitting the radial position of the source means to be readily changed with respect to the hose reel assembly without imposing stress upon the hose connections therebetween.

2. An assembly according to claim 1, wherein said motor means is a spring motor having a casing adjustably connected to said base means and spring means connected between said casing and said shaft means;

wherein said central sleeve portion of said journal box and said journal portion of said shaft means have concentric adjacent cylindrical wall means; and

wherein said inlet passageway means includes a pair of spaced inlet openings formed in and extending radially through the central sleeve portion and a pair of axially spaced annular groove means in said wall means with said groove means being in communication with one of said inlet openings.

3. An assembly according to claim 2, wherein said journal box includes a pair of bearing means engaging said shaft means adjacent opposite axial ends of said central sleeve portion;

wherein said inlet passageway means are spaced axially of said shaft means; and

including shaft seals on both sides of said pair of annular groove means between said adjacent cylindrical wall means.

4. A reel assembly according to claim 2, wherein said drum means is concentrically mounted upon said shaft means and said outlet conduit means are radially aligned with said drum means;

wherein said drum means has circumferential wall means with a pair of circumferentially spaced openings therethrough; and

wherein said outlet conduit means include a pair of fixtures secured to said shaft means on diametrically opposite sides of said shaft means and connected to said pair of discharge hose means, said discharge hose means extending through said openings in said circumferential wall means.

5. An assembly according to claim 1, wherein said motor means is a spring motor having a casing connected to said base means and spring means connected between said casing and said shaft means, said motor means being positioned adjacent one axial end of said shaft means;

said drum means being nonrotatably mounted upon said shaft means adjacent the other axial end thereof; and

said central sleeve portion being positioned between said motor means and said drum means in surrounding rotatable relationship with an intermediate portion of said shaft means, said inlet passageway means including a pair of openings extending radially through said central sleeve portion with each of said openings being adapted to be connected to one of said supply hose means.

6. In a hose reel assembly having a base means, shaft means supported by said base means, spring motor means drivingly connected between said shaft means and said base means, drum means mounted upon said shaft means for coaxial rotation therewith, discharge hose means wound upon said drum means, and communication means for connecting said hose means to a source of pressure fluid, comprising:

a bearing pedestal mounted upon said base means and having a pair of spaced bearing supports extending therefrom;

a pair of bearing means mounted coaxially upon said bearing supports;

journal means on said shaft means rotatably disposed within said bearing means;

collar means encircling said shaft means between said bearing supports, said collar means and said journal means having adjacent, concentric and cylindrical

wall means, said collar means being freely rotatable relative to said shaft means and relative to said bearing supports;

passage means extending lengthwise within said shaft means from within said journal means to a location outwardly thereof;

inlet port means extending radially through said collar means and said journal means for communication between said passage means and said source, said inlet port means including annular groove means in said wall means;

outlet port means extending transaxially into said shaft means for communication with said passage means

at said location, said outlet port means being connectible to said hose means; and

shaft seal means between said wall means on opposite sides of said inlet port means.

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