May 27, 1952 C. A. ROSTINE 2,598,306

HOSE-REELING APPARATUS

Filed March 8, 1949 2 SHEETS—SHEET 1

Fig. 1.

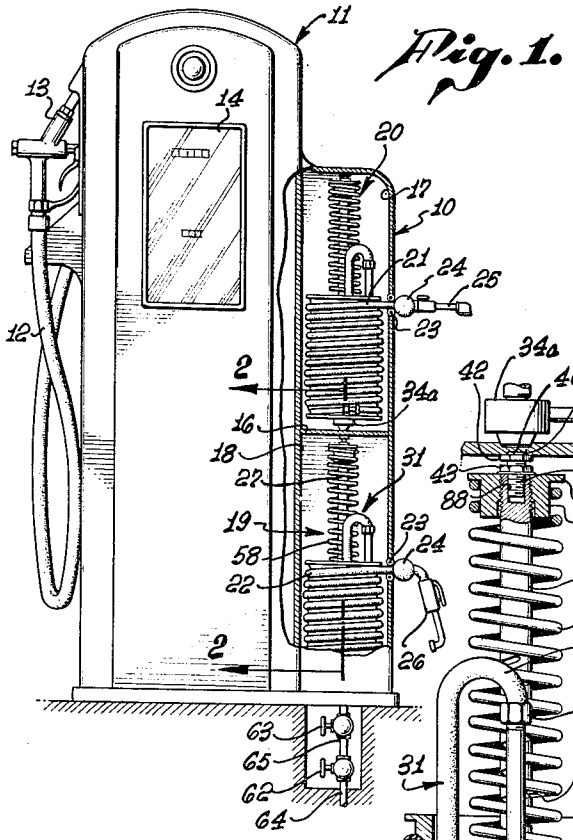


Fig. 2.

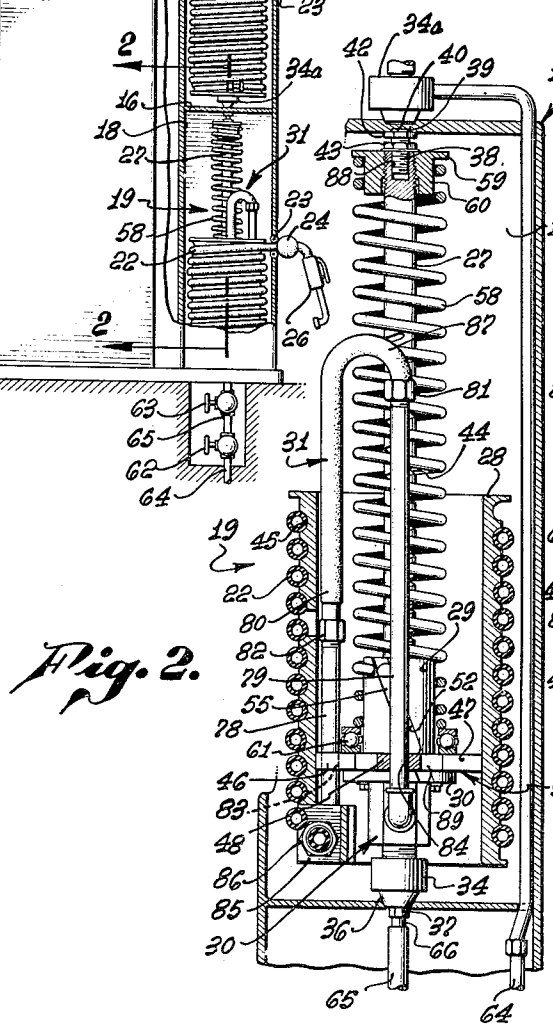
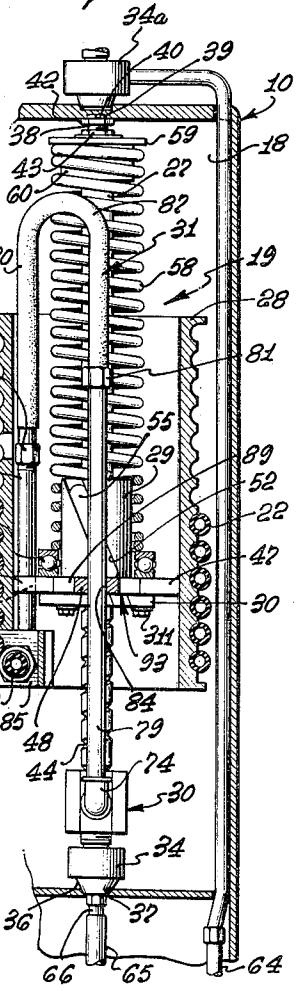


Fig. 3.



INVENTOR.
CARL A. ROSTINE,
BY Harbin White
ATTORNEY.

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Fig. 4.

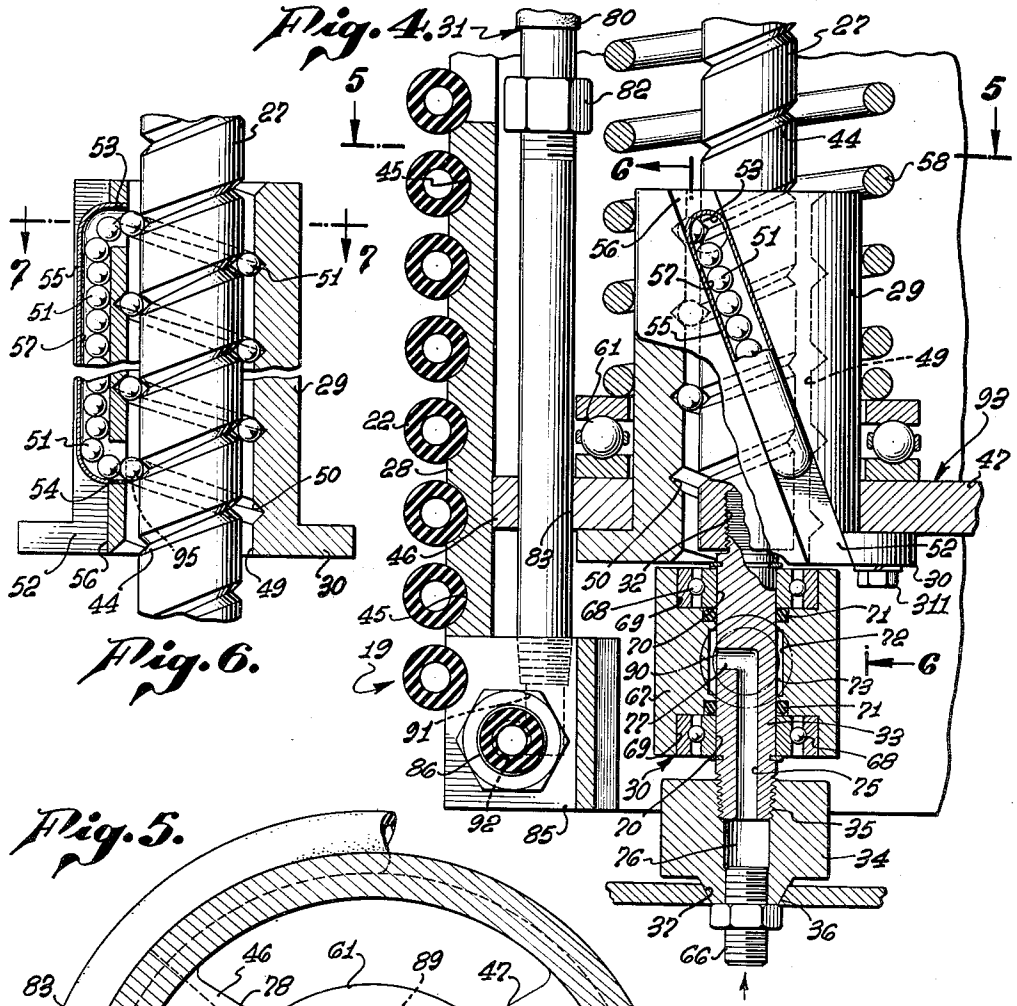
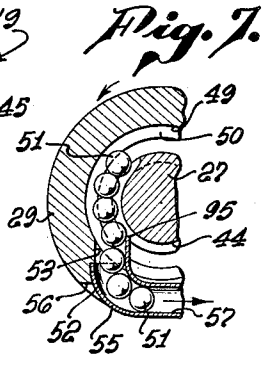


Fig. 6.

Fig. 5.

Fig. 7.



INVENTOR.
CARL A. ROSTINE,
BY Hamilton White
ATTORNEY.

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HOSE REELING APPARATUS

Carl A. Rostine, Gardena, Calif., assignor, by mesne assignments, to John Wood Company, New York, N. Y., a corporation of Delaware

Application March 8, 1949, Serial No. 80,137

10 Claims. (Cl. 299—78)

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This invention relates to hose reeling apparatus and particularly to devices in which a winding drum is axially movable during withdrawal and retraction of a hose.

A major object of the invention is to provide an improved fluid supply conduit for such an axially movable drum and adapted to introduce fluid into the moving inlet end of a hose carried by the drum. Specifically, the present supply conduit is an improvement over the spiral type of conduit disclosed in application Number 786,418, filed November 17, 1947, by Earnest E. Martin, now Patent No. 2,478,494.

The invention is particularly characterized by the provision of a flexible supply conduit within the reeling drum forming a reverse curve or loop extending axially of the drum and adapted to advance by virtue of the flexibility upon axial movement of the drum. An inlet end of the conduit may be placed in communication with a fluid supply line and retained against axial movement with the drum, while the outlet end is secured to and movable with the drum. Advancement of the axially movable end effects advancement of the conduit loop while maintaining fluid supply to the hose at all times. The supply conduit may be bodily rotatable with the drum during winding and unwinding of the hose, and, in that case, is placed in communication with a swivel inlet connection. I find it most desirable that the conduit have rigid end portions adapted for maintenance in predetermined axially extending positions to assure correct positioning of the flexible intermediate loop.

Preferably, I mount the supply conduit in a manner mimimizing any tendency toward injury by virtue of movement relative to the drum. For this purpose, the conduit is spaced from the inner wall of the drum in a manner preventing frictional contact with that wall. The conduit may be disposed between the drum and a shaft about which the drum is carried.

The above and further features and objects of the present invention will be better understood from the following detailed description of the typical embodiment illustrated in the accompanying drawings, in which:

Fig. 1 is a front elevational, partly in section, showing a pair of air and water hose reeling units contained within the side of a service station fuel pump column;

Fig. 2 is an enlarged fragmentary vertical section through the lower of these hose reels, taken on line 2—2 of Fig. 1; and showing the hose in its normal retracted position;

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Fig. 3 is a view corresponding to Fig. 2 but showing the hose partially withdrawn;

Fig. 4 is an enlarged fragmentary vertical section through the reeling device;

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 4;

Fig. 6 is a section showing the ball return channel of the nut and taken on line 6—6 of Fig. 4; and

Fig. 7 is a transverse section through the unit and shaft taken on line 7—7 of Fig. 6.

In the illustrated embodiment of the invention, I provide air and water hose reeling units for service station use, typically contained within a reduced dimension housing 10 projecting laterally from a conventional fuel pump housing 11 having the usual fuel hose 12, nozzle and valve 13, and computer 14. The laterally projecting housing 10 is divided interiorly by horizontal partition 16 into upper and lower spaces 17 and 18 containing reeling units 19 and 20 for winding air and water hoses 21 and 22, respectively. Each of these hoses passes outwardly from the housing between the usual rollers 23, and carries, at the outside of the rollers, a ball enlargement 24 limiting automatic take-up or retraction of the hose. Outwardly beyond enlargement 24, hose 21 carries a conventional air dispensing valve and chuck 25, and hose 22 carries water dispensing valve 26.

Reeling units 19 and 20 are structurally identical except with respect to a minor difference in their support members 34 and 34a, to be brought out later, and therefore only unit 19 will be described in detail. As seen in Figs. 2 and 3, unit 19 comprises essentially central stationary shaft 27, drum 28 mounted by nut 29 for both axial and rotational movement relative to the shaft, swivel inlet 30, and fluid supply conduit 31 whose structure is an important feature of the invention. Shaft 27 contains a threaded recess 32 at its lower end (see Fig. 4), within which the upper end of central stationary shaft 33 of the swivel inlet is received. The lower end of this swivel shaft is threaded into tubular support member 34 at 35. Member 34 has a downwardly facing frusto-conical surface 36 resting on the correspondingly frusto-conical edge surface of opening 37 in base 15 of the housing to thus stationarily support shafts 33 and 27 in the illustrated positions. Shaft 27 also has a recess at its upper end, internally threaded at 38 to receive threaded shaft extension or lock stud 38, whose upper end 39 is received within recess 40 in partition 16 to locate the upper end of the shaft. En-

larged nut portion 42 of stud 38 permits its axial adjustment relative to shaft 27, and lock nut 43 retains the stud in a desired relative setting. Shaft 27 has an external spiral V-shaped groove 44, serving, as will appear, to cause rotation of the drum in response to its axial movement, and vice versa.

Drum 28 has a spiral hose receiving groove 45 in its outer surface, within which the hose is normally wound. Near its lower end, the drum carries a transverse frame element 93, comprising radial spokes or webs 46, 47 and 48 and a ring 89 carried by the inner ends of these spokes. The ring is rigidly secured to nut 29 through connection with its lower transverse flange 30, as by screw bolts 31.

Nut 29 is tubular, and has an internal surface 49 of a diameter somewhat greater than the external diameter of shaft 27 (see Figs. 3 and 5). The inner surface 49 of the nut has a spiral V-shaped groove 50 of a pitch corresponding to the pitch of groove 44 in shaft 27. Balls 51 are received between the nut and shaft within grooves 44 and 50 to form the equivalent of a threaded connection between the nut and shaft. The balls, of course, reduce friction to a minimum as the nut travels along the shaft. At one side, the nut has a diagonal recess or slot 52 communicating with groove 50 near its upper and lower ends through substantially tangential openings 53 and 54. Ball return channel or guide element 55 is received within recess 52, as best seen in Fig. 6 and forms, with nut surface 56 at the inside of recess 52, a return passage 57 directing the balls either upwardly or downwardly between openings 53 and 54. Thus, as the nut is rotated for upward advancement along shaft 27, the balls travel downwardly along groove 50, out opening 54 in the nut, upwardly through passage 57, and through opening 53 into the upper end of groove 51. Similarly, upon downward movement of the nut, the balls travel upwardly along groove 50 and return downwardly through passage 57. Each end of guide 55 has an inwardly extending ear 95 preventing movement of the balls along the spiral grooves beyond the corresponding tangential opening 53 or 54 (see Fig. 7).

The drum is normally urged downwardly by spiral spring 58, which bears, at its upper end, against flange 59 of nut 60, carried by the upper end of shaft 27. At its lower end, spring 58 bears against thrust ball bearing 61, which in turn engages ring 89 of frame element 93. Air and water are supplied to the hoses through valves 62 and 63 and upwardly extending conduits 64 and 65, respectively. Conduit 65 is connected to the lower end of member 34 by nipple 66. Conduit 64 extends upwardly at the side of space 18 and then horizontally within space 17 to connect with member 34a, which corresponds to member 34 of the lower reeling unit except for the provision of a side rather than a bottom inlet.

Swivel inlet connection 30 includes a tubular body 67 rotatably carried about stationary shaft 33. As seen in Fig. 4, body 67 contains a pair of ball bearings 68 carried within enlarged diameter bores 69 at opposite ends of the body, and engaging shaft 33 at 70. Beneath the upper of these ball bearings, and above the lower one, the body carries a pair of sealing O-rings 71 preventing fluid passage outwardly along shaft 33. Between these O-rings, the body has an annular recess 72 of a diameter greater than the external diameter of shaft 33, to form, with the shaft, annular fluid conducting passage 73. At one side, body 67 has an outwardly extending passage 90 communicating with passage 73 and leading into elbow connection 74. Shaft 33 has an internal passage 75 directing water or air from space 76 within member 34 upwardly and then outwardly at 77 into annular passage 73.

Fluid supply conduit 31 includes a pair of axially extending rigid portions or pipes 78 and 79, and an intermediate flexible portion or tube 80, connected to the rigid pipes by fittings 81 and 82. The first or inlet pipe 79 is connected at its lower end to elbow 74 and passes upwardly through axial opening 83 in drum spoke 46, thus being maintained in predetermined angular relation with respect to the drum. Opening 83 is slightly larger than the external diameter of the pipe to permit axial movement of the drum relative to the pipe. Rigid portion or pipe 79 of the supply conduit extends through an opening 84 in spoke 48 and connects at its lower end with block 85, to which the inner end of the hose is secured by threaded reception of fitting 86. Block 85 contains inner passages 91 and 92 directing fluid from pipe 79 into the hose. Flexible tube 80 forms an axially extending return curve or loop at 87. As will be understood, fitting 81 is maintained by pipe 79 against axial movement, whereas fitting 82 moves upwardly and downwardly with the drum. Thus, as the drum moves axially, loop 87 advances, as for instance from the normal condition of Fig. 2 to the partially withdrawn condition of Fig. 3. Of course, the supply conduit rotates bodily with the drum at all times by virtue of its passage through the spokes of frame element 93.

In operating the dispensing units, valves 62 and 63 are first opened to supply air and water respectively to fittings 25 and 26. Water, for instance, flows upwardly through line 65, nipple 66, passage 76 in member 34, and passage 75 in the swivel shaft, then outwardly into annular passage 73, through elbow 74, supply conduit 31, block 85, and into hose 21. Air follows a similar course from line 64 and member 34a into the hose 22. Upon retraction of either hose, the corresponding drum is rotated, and, by virtue of nut 29, advanced upwardly along shaft 27. With this vertical or axial movement of the drum, flexible portion 80 of conduit 31 advances in the manner previously described, to the condition of Fig. 3. Upon release of the withdrawn hose, spring 58 returns the drum downwardly along the shaft, resulting in reeling rotation of the drum and return of the entire apparatus to the normal condition of Fig. 2.

I claim:

1. Hose reeling apparatus, comprising a hose carrying drum mounted for both rotation and axial movement, a traverse frame element within said drum having an axially extending opening, a fluid supply conduit having a rigid portion extending axially of said drum and slidably received in said opening for rotation with the drum, said drum being axially movable relative to said rigid portion of the conduit, a swivel inlet connection communicating with said rigid portion of the conduit at one side of said frame element and maintaining said portion against axial movement with said drum, said conduit having a flexible portion at the other side of said frame element and having an end fixed relative to the drum for movement therewith, said flexible portion forming a reverse curve extending axially of said drum and advanceable axially therewith.

2. Hose reeling apparatus, comprising a hose

carrying drum mounted for both rotation and axial movement, a transverse frame element within said drum having a pair of axially extending openings, a fluid supply conduit comprising a pair of end portions passing through said openings and a flexible intermediate portion forming a reverse curve extending axially of said drum at one side of said frame element, a swivel inlet connection communicating with one of said end portions at the other side of said frame element and maintaining said one end portion against displacement axially with the drum, and means maintaining the other of said end portions fixed relative to the drum for movement therewith.

3. Hose reeling apparatus comprising a hose carrying drum mounted for both rotation about an axis and movement axially therealong, a swivel inlet fitting free for rotational but not axial movement with the drum, a fluid supply conduit having an inlet end axially fixed relative to the swivel inlet fitting to receive fluid therefrom and having a flexible portion adapted for extension upon movement of the drum in a first axial direction, and said conduit having a rigid portion interlocking the drum and swivel inlet fitting for rotation together.

4. Hose reeling apparatus comprising a hose carrying drum mounted for both rotation about an axis and movement axially therealong, a swivel inlet fitting free for rotational but not axial movement with the drum, a flexible fluid supply conduit having an inlet end axially fixed relative to the swivel inlet fitting to receive fluid therefrom and having an outlet end fixed relative to the drum, and means interlocking said drum and said swivel inlet fitting in unitary rotational relation; whereby, rotation of said drum induces corresponding rotation of said swivel inlet fitting.

5. Hose reeling apparatus comprising a drum, means mounting said drum for both rotation about its axis and translational movement in the direction of said axis, a hose carried by said drum, a flexible fluid supply conduit having an outlet end connected to said drum for movement therewith and communicating with said hose and an inlet end rotatable with said drum but fixed against translational movement therewith, said conduit extending from a first of said ends thereof in a direction generally parallel to said axis and then being doubled back in a generally reverse direction to the second end to form a U-shaped loop, and means for supplying fluid to said inlet end.

6. Hose reeling apparatus comprising a drum, means mounting said drum for both rotation about its axis and translational movement in the direction of said axis, a hose carried by said drum, a flexible fluid supply conduit having an outlet end communicating with said hose and fixed relative to the drum for movement therewith, said conduit having an inlet end rotatable with said drum but fixed against translational movement therewith, said conduit extending from a first of said ends in a direction generally parallel to said axis and then being doubled back in a generally reverse direction to the second end to form a U-shaped loop, and a swivel inlet connection connectable with a source of fluid, communicating with said inlet end of the conduit, and rotatable therewith.

7. Hose reeling apparatus as recited in claim 5 in which said mounting means includes a shaft extending through and mounting the drum for said rotation, said drum being translatable axially relative to said shaft and having a tubular wall radially spaced from said shaft, and said flexible fluid supply conduit having a portion positioned within the interior of said drum and between said wall and said shaft.

8. Hose reeling apparatus as recited in claim 5 in which said mounting means includes a shaft extending through and mounting the drum for said rotation, said drum being translatable axially relative to said shaft and having a tubular wall spaced radially from said shaft, and a coil spring disposed about said shaft interiorly of said drum and normally urging said drum in a first axial direction, said flexible conduit having a portion positioned between said spring and said drum wall.

9. Hose reeling apparatus comprising a drum, means mounting said drum for both rotation about its axis and translational movement in the direction of said axis, a hose carried by said drum, a swivel inlet fitting connectable with a source of fluid and being free for rotational but not translational movement with said drum, a flexible fluid supply conduit having an inlet end fixed relative to said swivel inlet fitting to receive fluid therefrom and having an outlet end fixed relative to said drum and communicating with said hose, and a rigid driving connection interlocking said drum and swivel inlet fitting for rotation together.

10. Hose reeling apparatus as recited in claim 3, in which said flexible portion of the fluid supply conduit extends from said inlet end thereof in a direction generally parallel to said axis and is then doubled back in a generally reverse direction to an outlet end thereof movable with the drum to form a U-shaped loop.

CARL A. ROSTINE.

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