May 27, 1969 S. LINDERMAN 3,446,235

HOSE-HANDLING APPARATUS, SELF-PROPELLED, WITH HORIZONTAL DRUM

Filed June 13, 1966 Sheet 1 of 3

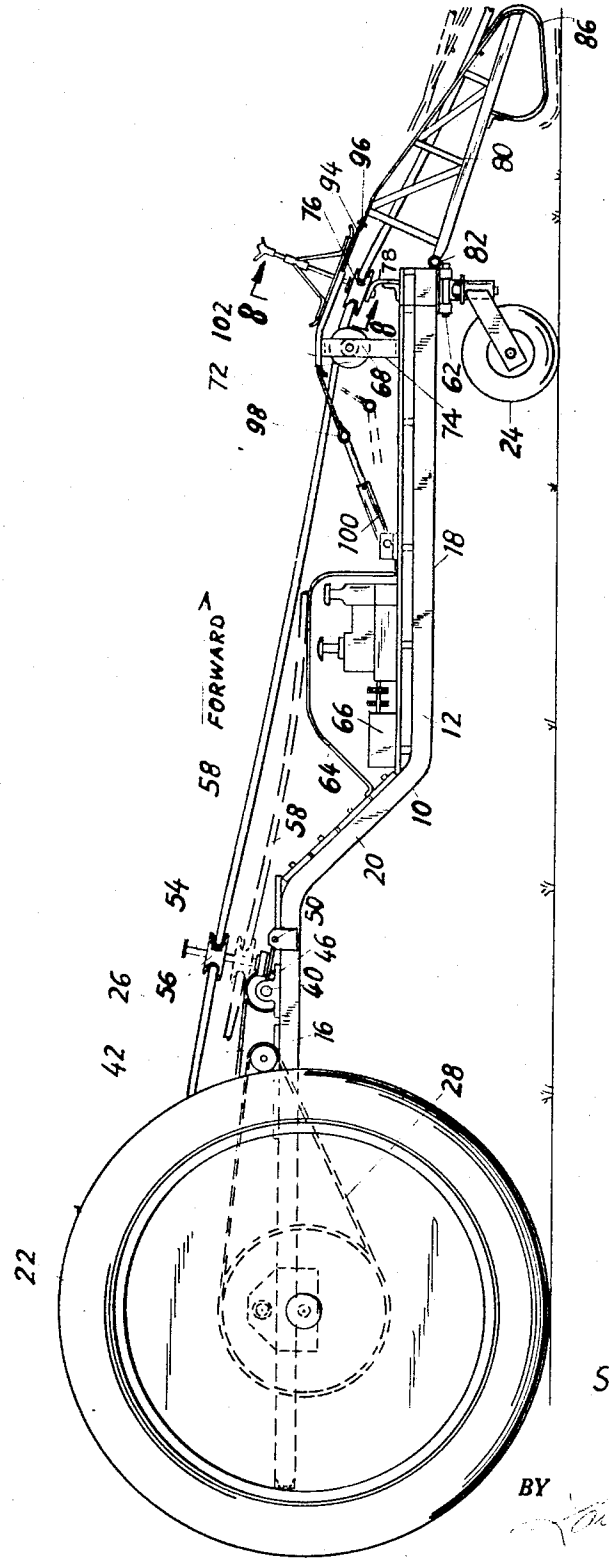

Fig. 1

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HOSE-HANDLING APPARATUS, SELF-PROPELLED, WITH HORIZONTAL DRUM

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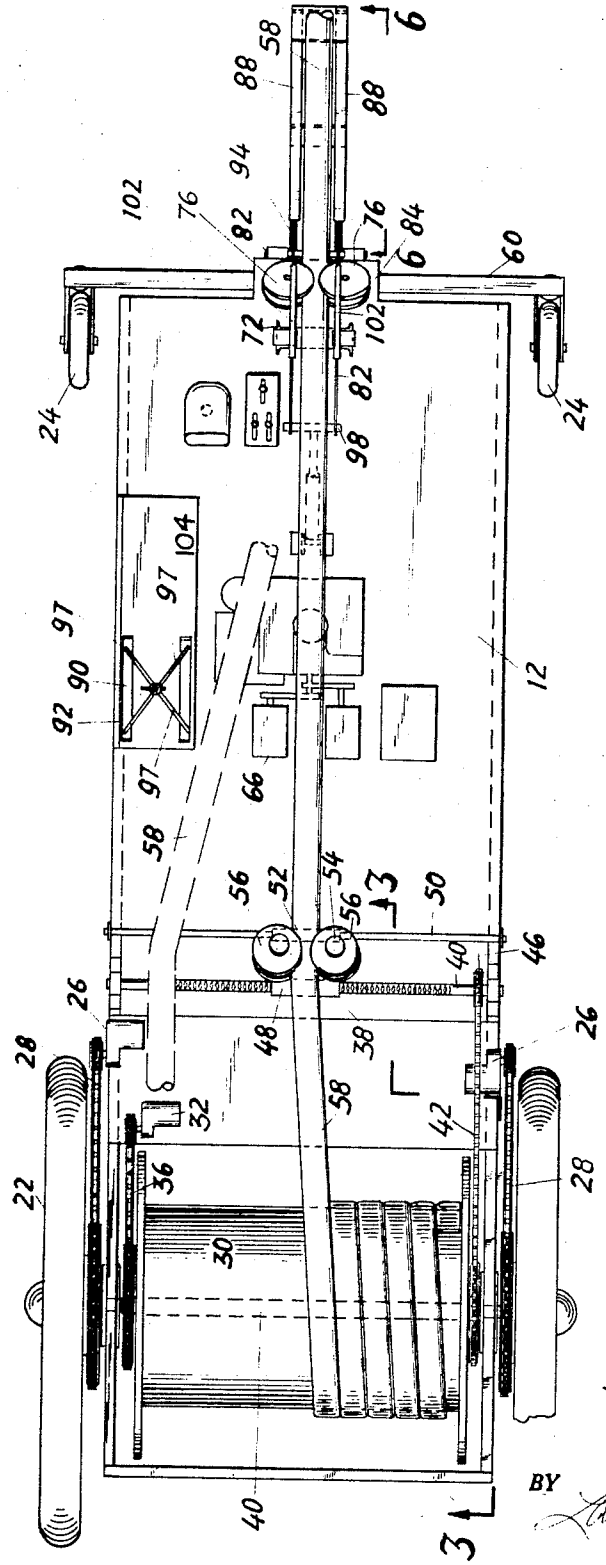

Fig. 2

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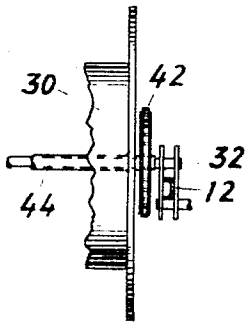

Fig. 4

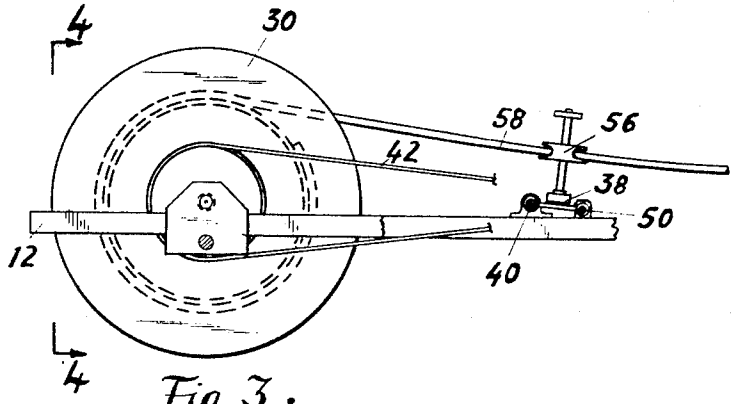

Fig. 3.

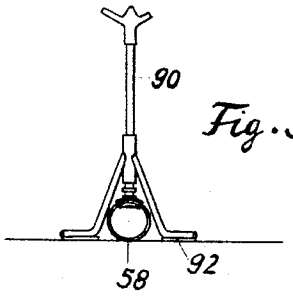

Fig. 5

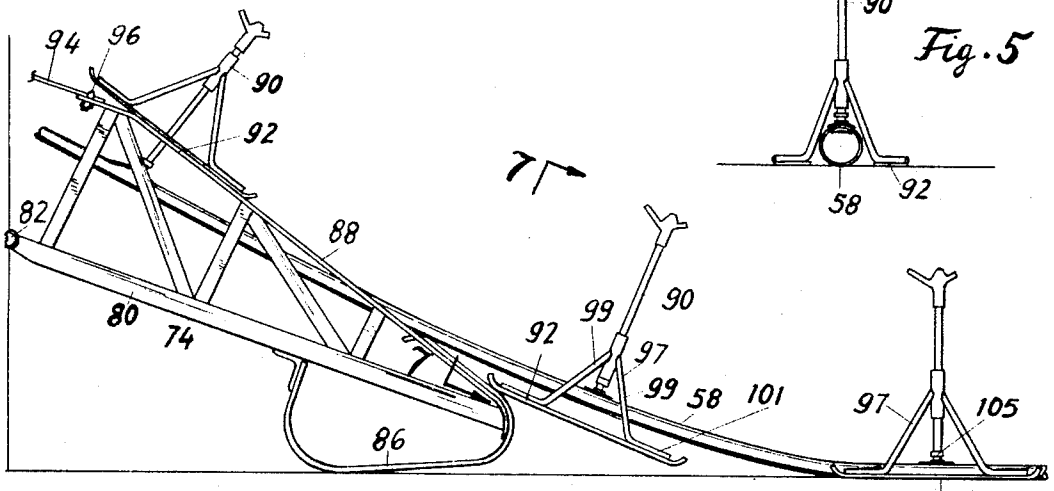

Fig. 6

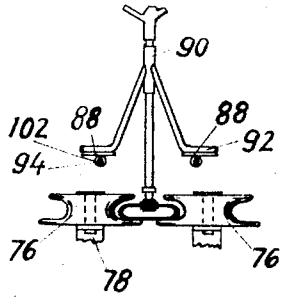

Fig. 8

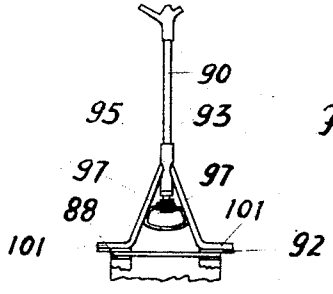

Fig. 7

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United States Patent Office 3,446,235
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3,446,235

HOSE-HANDLING APPARATUS, SELF-PROPELLED, WITH HORIZONTAL DRUM

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Int. Cl. B60p 3/30
U.S. Cl. 137—344 10 Claims

ABSTRACT OF THE DISCLOSURE

An apparatus for winding and unwinding hose, including a frame with drum means on it and guide means for lifting the hose from the ground including cantilever means which consists of a truss structure pivotally connected to the apparatus and ram means operatively connected to the structure to raise and lower it.

The present invention relates to improvements in hose reel apparatus and more particularly to a hose reel apparatus that is self propelled.

In accordance with the present invention, a machine that is self propelled is provided for picking up, transporting and placing irrigation hoses again onto the ground at any desired location and position.

It is another object of the present invention to provide a hose handling machine of large proportions so that it is capable of carrying its operator and power equipment as well as the special devices for handling the hoses which are of large capacity and of great length.

It is an object of the present invention to provide a large hose handling machine that is comparatively simple to operate and maintain and manufacture, and in which the self propelled vehicle has a frame which is high enough to pass over most crops.

It is another object of the present invention to provide a hose reel apparatus having front wheel steering means that are separately operated by hydraulic motor means and controlled through separate valve means by the operator and which are of the castor type.

It is another object of the present invention to provide front wheel means for the hose reel apparatus of the present invention in which the front wheel means are provided with pivot means to permit them to tilt separately so as to compensate for uneven terrain.

It is another object of the present invention to provide hose reel apparatus having cover means that are disposed over the engine and associated equipment upon which the hose being reeled in or out may slide so as not to interfere with or damage the engine or other equipment.

It is another object of the present invention to provide a hose reeling apparatus having a powered horizontal drum mounted on the vehicle frame for winding and unwinding the irrigation hose therefrom.

It is yet another object of the present invention to provide a hose reel apparatus having winding guide means powered by rotation of the hose reel drum provided with a shaft with a left and a right hand thread thereon and an anti-torque rod means with a carriage containing a follower that follows the grooves of the threads in a reciprocating manner taking the carriage and hose from one end of the drum to the other.

It is another object of the present invention to provide sheave means on the frame to properly guide the flexible hose being reeled and unwound from the drum means.

It is yet another object of the present invention to provide a hose reel apparatus provided with advance guide means disposed adjacent the forward end of the vehicle for properly guiding the hose and the water risers from the terrain as the hose is reeled in.

It is another object of the present invention to provide cantilever guide means that can be raised and lowered adjacent the front end of the apparatus so as to properly guide the hose and the water risers as they are taken in or unreeled and disposed on the terrain.

It is yet another object of the preset invention to provide means for maintaining the cable means utilized in the present invention properly tensioned or taut so that the hose may be properly reeled in and the water risers can be properly disconnected to detached from the hose.

It is yet another object of the present invention to provide hose reeling apparatus that is provided with means for raising water risers above the irrigation hose with which they are connected as desired so that they can be readily disconnected from the hose.

Various other objects and advantages of the present invention will be readily apparent from the following detailed description when considered in connection with the accompanying drawings forming a part thereof and in which:

FIGURE 1 is a side elevational view illustrating the hose handling apparatus embodying the present invention;

FIGURE 2 is a top plane view of the apparatus shown in FIGURE 1;

FIGURE 3 is a side elevational view partly in section taken along the line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary view taken in the direction of the arrows 4—4 of FIGURE 3;

FIGURE 5 is a detail view of a water riser shown connected to the irrigation hose and properly disposed on the terrain during operation with the hose inflated and water pressure;

FIGURE 6 is an enlarged detail view of the front end of the apparatus illustrating the method of reeling in the hose and the water risers attached thereto;

FIGURE 7 is a view taken along the line 7—7 of FIGURE 6, and

FIGURE 8 is a detail view taken along the line 8—8 of FIGURE 1 showing the hose being reeled in when it is deflated and emptied of water.

Referring to the drawings the reference numeral **10** generally designates a hose reeling apparatus comprising a substantially horizontal frame **12** having a rear upper horizontal portion **16** and a front lower horizontal portion **18** between which is an inclined portion **20**.

The apparatus is self propelled and is provided with large rear wheels **22** and small front wheels **24**. The drive is through the rear wheels **22** and each rear wheel is separately driven by a hydraulic motor **26** and sprocket chain drive **28** of well known construction. The provision of the separate drive enables the vehicle to be readily turned in any direction as desired.

Disposed between the rear wheels is a hose reel drum **30** which extends in a horizontal direction and is rotated by a hydraulic motor **32** and sprocket chain drive **36** of well known construction.

Referring to FIGURES 2 to 4 it will be noted that the apparatus is provided with a winding guide means **38** adjacent the forward end of the drum **30**, and disposed on the platform for guiding the hose as it is reeled onto or unwound from the drum **30**. The winding guide means is provided with a horizontal and transversely extending shaft **40** which is rotatably driven by a sprocket chain **42** operatively connected to the drum axle **44** and a gear **46** on the shaft **40**.

The transverse rotary shaft, as best seen in FIGURE 2, is externally screw threaded to form both right and left hand threads. The shaft **40** carries a sleeve or carriage **48** thereon adapted to slide back and forth in a transversely reciprocating movement in timed relation with the revolution of the hose reel so as to automatically guide

the hose in proper winding convolutions on the reel. The winding guide means **38** is provided with a torque rod **50** which extends transversely of the frame **12** as best seen in FIGURE 2 and carries a sleeve **52** thereon forming part of the sleeve or carriage **48**. Two inclined shafts **54** are also carried on this winding guide means **38** and each shaft **54** is provided with a sheave or roller **56**. The pair of rollers **56** are spaced from each other so as to form a guide way for hose **58** being reeled onto the drum or being removed therefrom.

The provision of the winding guide means **38** permits the structure to slide back and forth in a transversely reciprocating movement in timed relation with the revolution of the drum **30** so as to automatically guide the hose into its proper winding convolutions.

Referring to FIGURES 1 and 2 it will be noted that the front caster wheels **24** are secured to a transverse front beam **60** so as to pivot in a vertical direction thereabout. In addition the casters are further secured to the cross beam **60** by horizontally extending pivot pins **62** so that the wheels can pivot about a longitudinal axis to compensate for uneven terrain that the vehicle passes over.

The main propulsion unit is generally designated **66** and is disposed on the lower portion **18** of the frame and within a housing or cover **64**. The main propulsion unit **66** is suitably and operatively connected to the various hydraulic pumps by any well known means not forming part of the present invention. It will be noted that the cover or housing **64** prevents the hose **58** from becoming entangled in the unit disposed thereunder.

The forward end of the lower platform **18** is provided with a roller guide means **68** comprising a horizontally extending elongated roller or sleeve roller **72** disposed on a support **74** so that the hose can be fed over the top of the roller as best seen in FIGURES 1 and 2.

Disposed forwardly of the sleeve roller **72** is a pair of sheaves or rollers **76** supported on upstanding brackets **78** which brackets are secured to the frame. The rollers **76** are disposed in spaced relationship with one another so as to lead and guide the hose **58** therebetween as it passes to the rearward rollers **56** or from the rearward rollers **56** as already described.

The front end of the platform is provided with a cantilever structure generally designated **80** that is pivotally connected at **82** to the central projecting portion **84** of the frame. This cantilever structure consists of a plurality of cross braces and diagonal members forming a truss that tapers down at its forward end so as to form a substantially triangular structure. The front lower end of this structure **80** is further provided with a runner member or snout slide **86** for disposal on the terrain. The cantilever structure **80** has a configuration which allows the hose to be fed therebetween and further has two spaced rails or guides **88**, as best seen in FIGURE 6 disposed on the top of the structure in order to permit the water risers **90** to slide thereon. The water riser or sprinklers **90** are provided with feet **92** adapted to slide on the guide rails **88**.

The position of the structure **80** is controlled by two cables **94** attached at **96** to the rearward end of the structure **80**. The two cables **94** in turn are connected to a cross bar **98** which is operatively connected to a hydraulic ram or cylinder **100** which is pivotally connected by any suitable means to the front portion **18** of the frame.

Referring to FIGURE 1 it will be seen that the hydraulic ram or cylinder **100** can be actuated so as to raise and lower the cantilever structure **80** through the cable connection.

The two sleeves **102** are secured by any suitable means to the roller support **74** as best seen in FIGURE 1, and it will be noted that the tubes have a substantially horizontally extending rearward portion and an inclined forward portion.

When it is desired to reel in the hose from the position shown in FIGURES 5 and 6, at which time the hose

is inflated and under water pressure, the water is first turned off and the hose is properly secured to the drum **30**. Thereafter the cantilever structure **80** is disposed in its lowermost position, as shown in FIGURE 6 by operating the ram so as to extend it to its full length and position the structure **80** against the terrain. Then as the reel is operated in order to reel in the hose the cylinder **100** is maintained at a proper position so as to maintain the cables taut and to permit the risers **90** to slide upwardly from the position shown in FIGURE 6 at which time their feet are below the hose **58**, so as to progressively raise the riser feet above the hose and into the position shown in the left side of FIGURE 6. This enables the riser to be easily detached from the hose and to be properly positioned in a storage place indicated at **104** on the platform **12**.

At this time the hose **58** is guide between the rollers **76** and the rollers **56** and the winding guide means **38** is reciprocated in a transverse direction so that the hose is properly wound on the drum.

When it is desired to unreel the hose and to place it in an irrigating position on the terrain, the same procedure is followed and the hose is fed out from between the rollers **56** and the rollers **76** and the cantilever structure **80** is utilized to insure the risers being disposed on the terrain in a vertical position as the hose is unreeled.

Referring to the water riser **90**, it will be noted that this water sprinkler comprises a vertical central water tube **93** on which is disposed a tubular sleeve **95** for sliding up and down the tube **93**. Sleeve **95** is supported by four leg members **97** extending diagonally downwardly and outwardly as indicated at **99** and terminating in the horizontal leg portions **101**. These leg portions **101** are secured to the feet **92** which slide on rails or guides **88**. It will be noted that there are two feet **92**, as best seen in FIGURE 2 which are elongated horizontal plates secured to the two leg members disposed on the same side of the central tube **93**. Tube **93** is connected to connection **103** on the hose by flange **105**.

This water riser holds the hose upright at all times and rides on the hose when the hose is lifted, until it gets to the rails **88**. It then slides on the rails onto the main body of the hose handling apparatus and at the same time the feet **92** rise above the hose in order to clear the sheave roller **76** for removal with the riser from the hose. The risers are usually spaced about 60 feet apart in the hose. The riser support leg members and structure can be replaced on the hose with the riser while still on the vehicle, and then slide on the trails, then ride on the hose itself until it touches the ground in proper position for holding the riser upright, for sprinkling without further handling by hand. The riser structure straddles the irrigation hose and slides up and down the riser center tube **93**.

From the present invention and the foregoing description, it is apparent that the hose handling apparatus embodied in this invention permits heavy and lengthy amounts of irrigation hose and the like to be reeled and unreeled from the drum, and to be moved from one place to another place when it is desired to irrigate another portion of a field, and with a minimum amount of effort and time consumed.

Inasmuch as various changes may be made in the relative arrangement and location of the parts without departing from the scope of the invention, it is not meant to limit the invention except by the scope of the appended claims.

What is claimed is:

1. A hose handling apparatus for winding and unwinding hose and the like comprising a frame with rotatable drum means thereon and hose guide means for lifting the hose from the ground including pivotal cantilever means, and means for pivoting said cantilever means to a predetermined position, said hose guide means including a first pair of spaced roller means disposed adjacent the front side of said rotatable drum means, and a second

pair of spaced roller means disposed forward of said first roller means, and rearwardly of said cantilever means, said cantilever means including a truss structure pivoted adjacent its rear end to the front end of said frame, and said pivoting means including ram means secured to said frame and operatively connected to the rear end of said cantilever structure.

2. The apparatus of claim 1 wherein said ram means includes a cylinder and piston and a cross bar, and cable means connected at one end to said cross bar and at its other end to said cantilever structure.

3. The apparatus of claim 1 wherein said frame is provided wheel means including castor wheels pivotally connected by a longitudinal pin to said frame.

4. The apparatus of claim 1 wherein said frame comprises a lower front portion and a higher front portion, and an inclined portion therebetween, and cover means are disposed adjacent the rear portion of said lower front portion for protecting propulsion equipment therein.

5. The apparatus of claim 1 wherein said cantilever structure has spaced guide rails thereon for receiving water risers attached to the hose being handled.

6. The apparatus of claim 1 wherein horizontal roller means are disposed rearwardly of and adjacent said second pair of roller means for receiving hose after it has passed from said second pair of roller means.

7. The apparatus of claim 6 wherein a right and left hand horizontal shaft and a torque rod is provided for carrying said first roller means to feed hose convolutions onto and off of said drum means.

8. The apparatus of claim 1 wherein said truss structure has two spaced triangular portions with a guide rail disposed on each portion for providing a slide for a water riser.

9. The device of claim 8 wherein said pivot means consist of pin members, and said guide rails are two spaced plates secured to the top of said triangular portions.

10. The device of claim 9 wherein a snout slide is secured to each of said triangular portions and consist of a looped member extending below the front end of the triangular portions.

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