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(54) **NET WINDER AND METHOD OF USING SAME**

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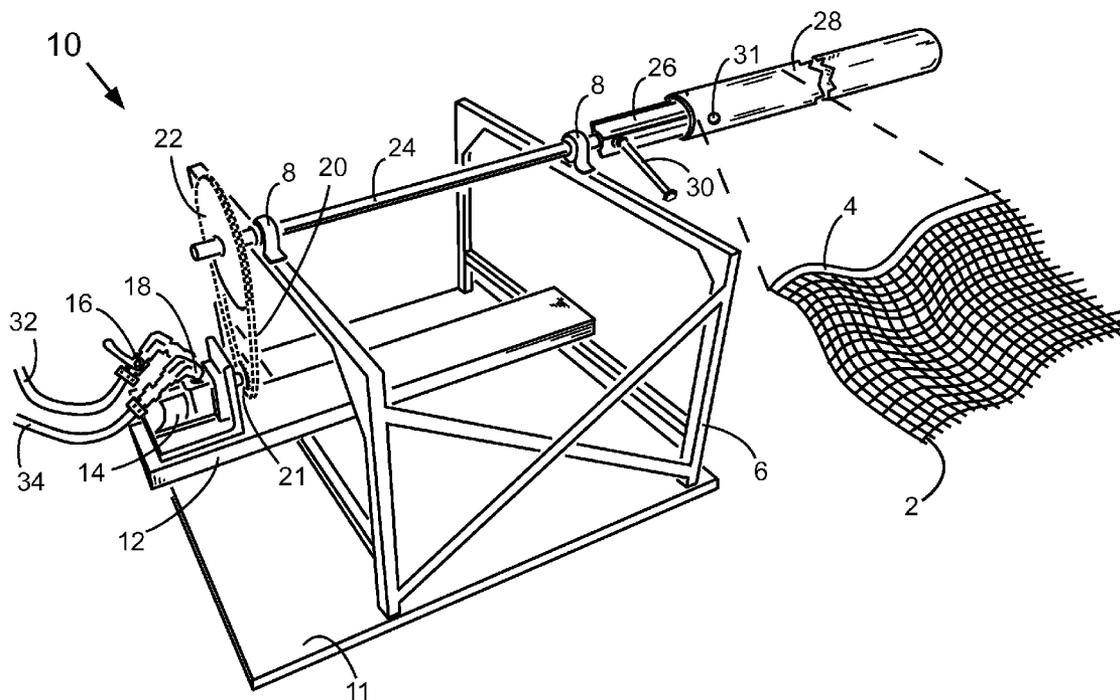
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(57) **ABSTRACT**

A net winder for winding up netting. A frame is mounted to a platform. A rotatable shaft is mounted to the top of the frame and an elongated cylindrical member is releasably connected thereto. A drive system causes the shaft to rotate which in turn causes the cylindrical member to rotate. Netting to be wound up is affixed to the cylindrical member and the net winder is operated to spool the netting onto the member. Once sufficient netting has been spooled onto the cylindrical member it can be removed from the shaft and a new one put on in its place.



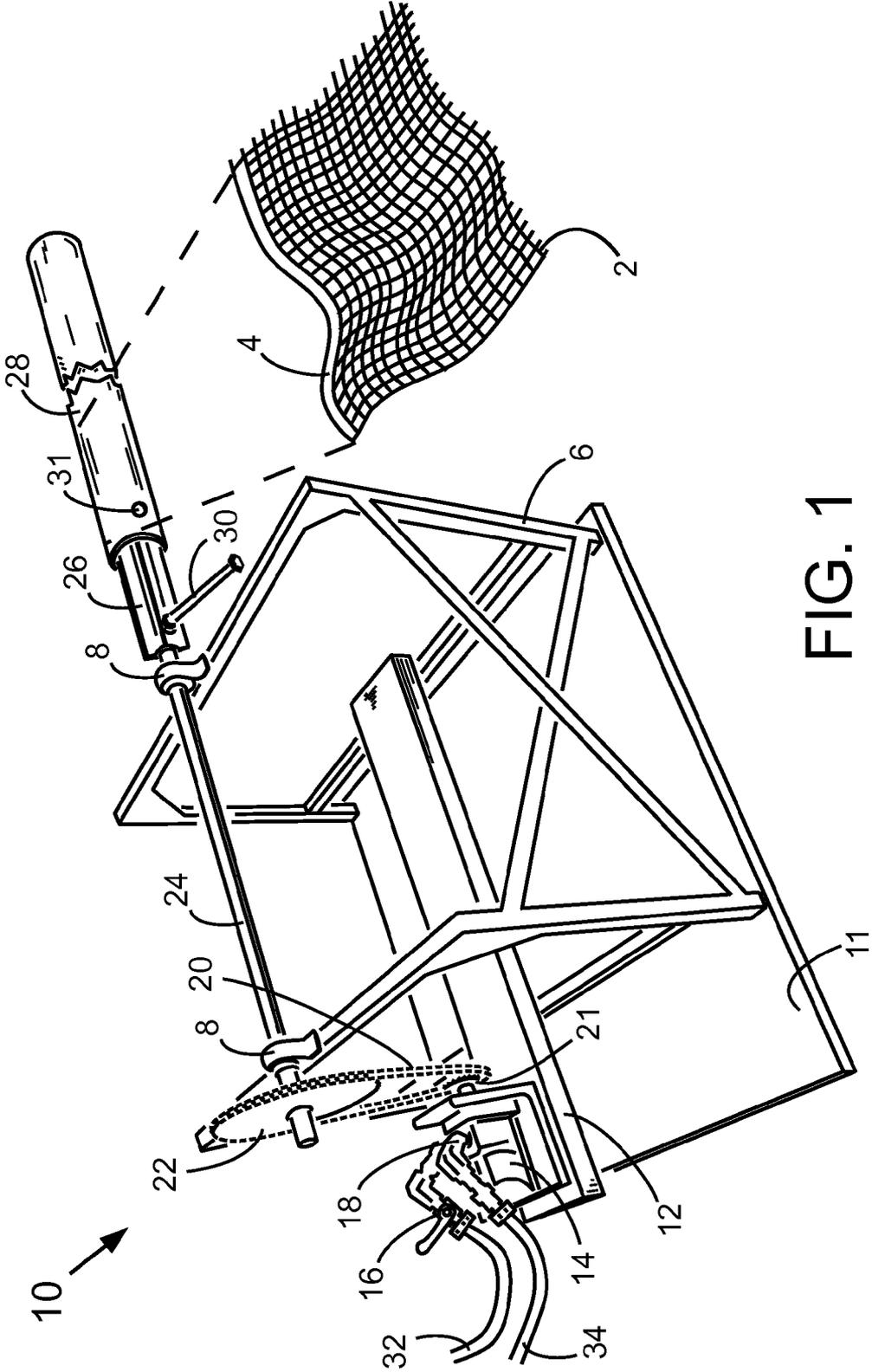


FIG. 1

NET WINDER AND METHOD OF USING SAME

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIELD OF THE INVENTION

[0001] The present invention relates to a net winder for winding up netting, such as the netting used to protect grapes or other agricultural products.

BACKGROUND OF THE INVENTION

[0002] Late in the summer grapevines enter a phase of their growth cycle that is known as veraison. Veraison occurs when red grape varieties begin to change the color of the grapes from green to red and it marks the beginning of sugar accumulation in the grapes. This change of color is in a sense a survival mechanism whereby the grape plant is attempting to disperse its seeds to ensure new plants propagate. The change in color from green to red and the increased sugar concentration attracts birds which feed on the grapes thereby dispersing the seeds. Bird damage can be significant and it is common practice to drape nets on the grapevines to protect the grapes from the birds. After harvest in the fall the nets must be removed in preparation for winter pruning. Removing the nets after harvest is a labour intensive process and is generally cumbersome and monotonous. I have created a "net winder" which simplifies and streamlines the process of getting the nets off the plants.

[0003] Other objects of the invention will be apparent from the description that follows.

SUMMARY OF THE INVENTION

[0004] The invention consists of a net winder for winding up netting after use. A metal frame is seated on a platform and supports a rotatable shaft which is driven by a motor. A removably connectable cylindrical elongated member is connected to a portion of the shaft and the netting is wound onto it when the net winder is in operation.

[0005] When it is time to remove netting from overtop of grapevines, the netting is detached from the grapevines and laid on the ground in between adjacent rows of grapevines. The net winder device is positioned via tractor at the end of the row and the netting wound around and affixed to the rotatable elongated member on the shaft of the net winder. The shaft is caused to rotate, thereby winding up the netting.

[0006] The foregoing was intended as a broad summary only and of only some of the aspects of the invention. It was not intended to define the limits or requirements of the invention. Other aspects of the invention will be appreciated by reference to the detailed description of the preferred embodiment and to the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings and wherein:

[0008] FIG. 1 is a perspective view of a net winder according to the present invention.

[0009] The net winder 10 comprises a rotatable shaft 24 mounted on a frame 6, the shaft being rotatable by a motor 14 in order to wind up netting 2 or the like.

[0010] Preferably, the frame 6 is made of a rigid material such as 1 inch metal square tubing that is bolted to a platform 11. The platform 11 must be sufficiently strong to support the frame 6 and related components while in use. The platform 11 is preferably made of two sheets of ¾ inch plywood, however any material able to support the frame 6 and hold it in place would work; for example, metal, plastic and the like.

[0011] A pair of 1 inch bearings 8 are fastened to the two top pieces of the frame 6 and hold a 1 inch diameter shaft 24 in place. The 1" shaft 24 lies horizontally across the top of two sides of the frame 6. Preferably, one end of the shaft 24 protrudes approximately 4"-6" (short end) beyond the metal frame 6. The other end of the shaft protrudes approximately 6' (long end) beyond the metal frame 6.

[0012] The 'long end' of the shaft 24 is preferably fitted with 1/8"x3/4" steel plate in a 'x' pattern 26 so as to comfortably hold a 6"x2 1/2" piece of PVC pipe or other cylindrical elongated member 28. The PVC pipe 28 is removably fitted over the x pattern 26 and bolted to the shaft so as to turn with the shaft. It is contemplated that other connection techniques and materials may be used, provided that the cylindrical elongated member is removably attachable to the shaft and when attached it moves in synch with the shaft 24. In FIG. 1, the PVC pipe 28 is shown being mounted on the shaft. When fully mounted, bolt 30 is fitted through opening 31 in the PVC pipe and connected to the shaft 24 to hold the PVC pipe in place. The netting 2 is rolled onto the PVC pipe as discussed in more detail below.

[0013] On the 'short end', the shaft 24 is fitted with a gear 22 which is part of the drive mechanism. A hydraulic motor 14, also fitted with a gear 21, is mounted on the metal frame 6 below the 'short end' of the shaft. A chain 20 attaches the gear 21 on the hydraulic motor 14 to the gear 22 on the 'short end' of the shaft 24, so as to transfer rotational force from the motor 14 to the shaft 24. It is also contemplated that other motor types and mounting locations could be used, provided simply that there is a drive mechanism for rotating shaft 24 about its axis.

[0014] Preferably, the entire net winder rests on and is clamped to 3 point forks off the back of a tractor, or is otherwise connected to the tractor. The hydraulic motor is connected to the hydraulic system of the tractor with 3/8" hydraulic hoses 32, 34. Hydraulic hose 32 is connected to the motor with a hydraulic ball valve 16. Hydraulic hose 34 is connected via quick connect 18.

[0015] The process of winding the nets onto the net winder is as follows:

[0016] The tractor and net winder 10 do not need to drive up and down each row of the vineyard to accumulate the nets. Rather the tractor and net winder 10 drive around the perimeter of the vineyard and drag the nets out of the vineyard.

[0017] The tractor and net winder 10 are positioned at the end of the rows perpendicular to the row orientation. The nets 2 are first detached from the vines and laid on the ground in the middle of the row. The end of the net 4 is wound around the cylindrical elongated member 28 and secured with tape (tape is used to secure only the first net to the PVC) or other suitable fastener to the member 28. When the hydraulic system of the tractor is introduced to the hydraulic motor 14 of

the net winder 10, the shaft 24 (and the attached PVC pipe 28) of the net winder turns and the netting 2 is rolled onto the PVC pipe 28. If slight tension is maintained in the net by the operator then the net is wound onto the PVC more tightly and a more compact bundle is created. Once a roll of netting becomes sufficiently large the PVC pipe 28 is un-bolted from the shaft 24, the PVC 28 and roll of netting is removed, and a new piece of PVC is bolted to the shaft.

[0018] In order to unwind the netting 2 on a given elongated member 28, the system may be operated in reverse. Alternatively, the elongated member 28 can be fitted on the shaft 24, but not locked in place via bolt or other connection method. In this fashion, the elongated member is able to roll freely on the shaft. A user can simply grasp the netting and pull to unreel the net.

[0019] The hydraulic system of the tractor drives the hydraulic motor of the net winder therefore the net winder requires the farmer to have the necessary hydraulic connections on his/her tractor. Alternatively, if a different motor system is used these connections would not be necessary. For example a combustion or electric motor having a forward and reverse could be used so as to wind and unwind the netting.

[0020] Preferably, the speed at which the shaft turns is governed with hydraulic ball valve 16 which controls the flow of hydraulic fluid through the hydraulic motor. The hydraulic ball valve 16 is installed at the hydraulic motor but can be installed at other points of the system.

[0021] In a further embodiment, a second hydraulic ball valve (not shown) can be attached to the metal frame 6 and would act as a secondary on/off control. The second hydraulic ball valve would give the operator the ability to turn the net winder on/off without having to go to the tractor controls—ie the second ball valve would be positioned closer to where the farmer was spooling on the nets. In this embodiment, rather than going directly from the motor 14 to the tractor, hydraulic hose 34 would first go to this second ball valve and then from the second ball valve to the tractor. Ball valve 16 would remain in place to control speed. The second ball valve would act to turn the net winder on or off.

[0022] It will be appreciated by those skilled in the art that the preferred and alternative embodiments have been described in some detail but that certain modifications may be practiced without departing from the principles of the invention.

What is claimed is:

1. An apparatus for winding up an object comprising:
 - a rigid frame;
 - a shaft rotatably connected to said frame, said shaft having a first end projecting beyond a first side of said frame, and a second end projecting beyond a second side of said frame;
 - a drive mechanism connected to said shaft and operable to rotate said shaft; and
 - an elongated member, said elongated member being removably connectable to said shaft, so as to rotate with said shaft when driving by said drive mechanism.
2. The apparatus of claim 1 wherein said elongated member is fitted onto said second end of said shaft and removably connected thereto.
3. The apparatus of claim 1 wherein said shaft is connected to said frame by way of a plurality of bearings.
4. The apparatus of claim 1 wherein said drive mechanism is a hydraulic motor.
5. The apparatus of claim 4 wherein said hydraulic motor is connectable to a tractor hydraulic system.
6. The apparatus of claim 1 wherein said drive mechanism can be activated to rotate said shaft in a clockwise or counter clockwise direction.
7. The apparatus of claim 1 wherein said second end of said shaft is fitted with steel plate in an "x" pattern for receiving said elongated member.
8. The apparatus of claim 7 wherein said elongated member is bolted to said second end.
9. The apparatus of claim 8 wherein said elongated member is a cylindrical PVC pipe.
10. The apparatus of claim 1 wherein said frame is connected to a platform.
11. A method of winding up an object using the apparatus of claim 1, the method comprising:
 - connecting the object to the elongated member;
 - activating the drive mechanism and causing said shaft and elongated member to rotate, thereby winding said object onto said elongated member;
 - deactivating said drive mechanism once said object is fully wound onto said elongated member; and
 - disconnecting and removing said elongated member from said shaft.

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