

July 30, 1968

T. F. ROM

3,394,903

SNOW FENCE ERECTION AND REWINDING MACHINE

Filed Oct. 21, 1966

4 Sheets-Sheet 1

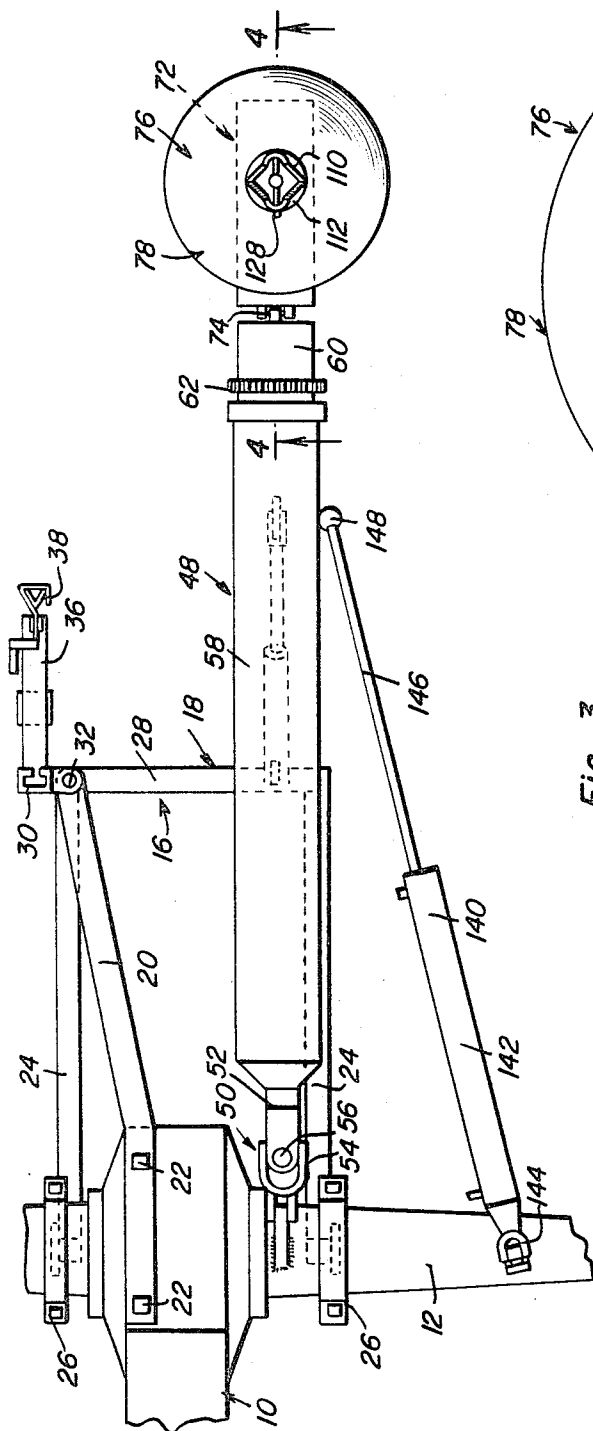


Fig. 1

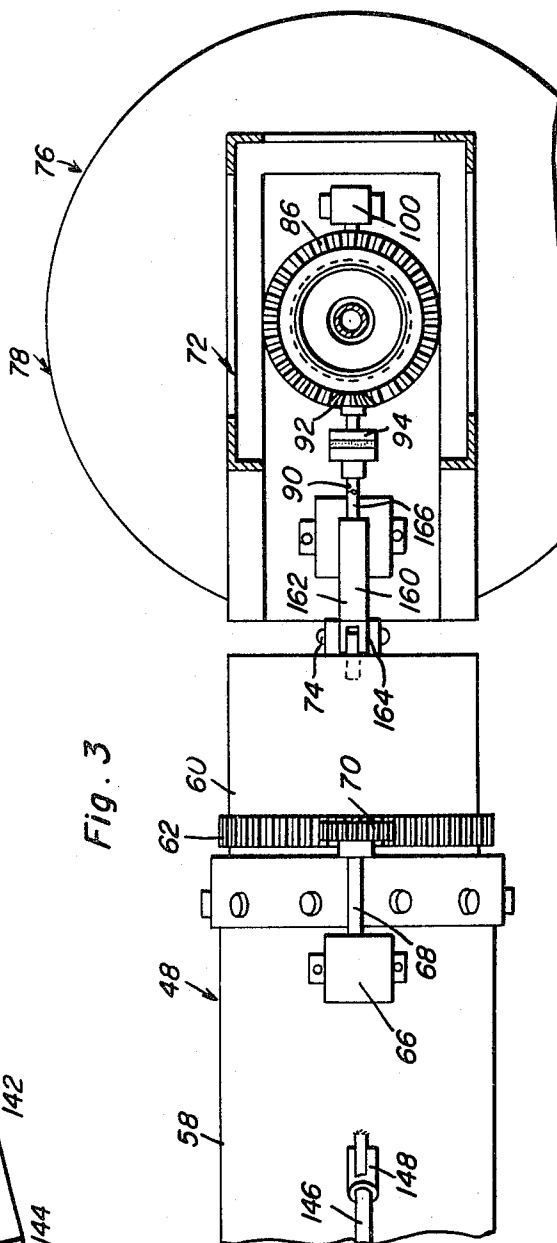


Fig. 3

Tony F. Rom

INVENTOR.

BY *Charles A. O'Brien*
and *Harvey B. Jacobson*
Attorneys

July 30, 1968

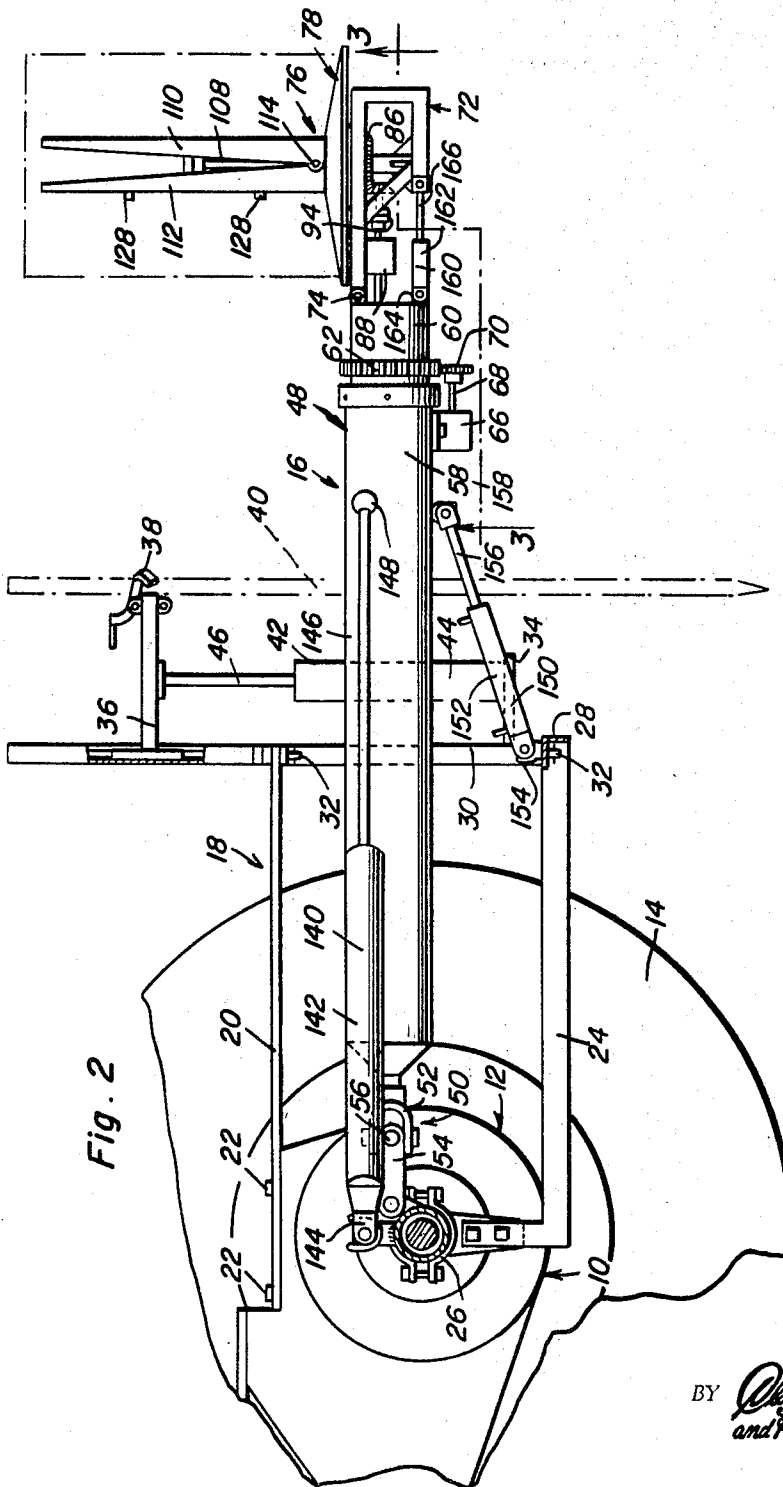
T. F. ROM

3,394,903

SNOW FENCE ERECTION AND REWINDING MACHINE

Filed Oct. 21, 1966.

4 Sheets-Sheet 2



Tony F. Rom
INVENTOR.

BY *Clarence A. O'Brien*
and Harvey E. Jacobson
Attorneys

July 30, 1968

T. F. ROM

3,394,903

SNOW FENCE ERECTION AND REWINDING MACHINE

Filed Oct. 21, 1966

4 Sheets-Sheet 3

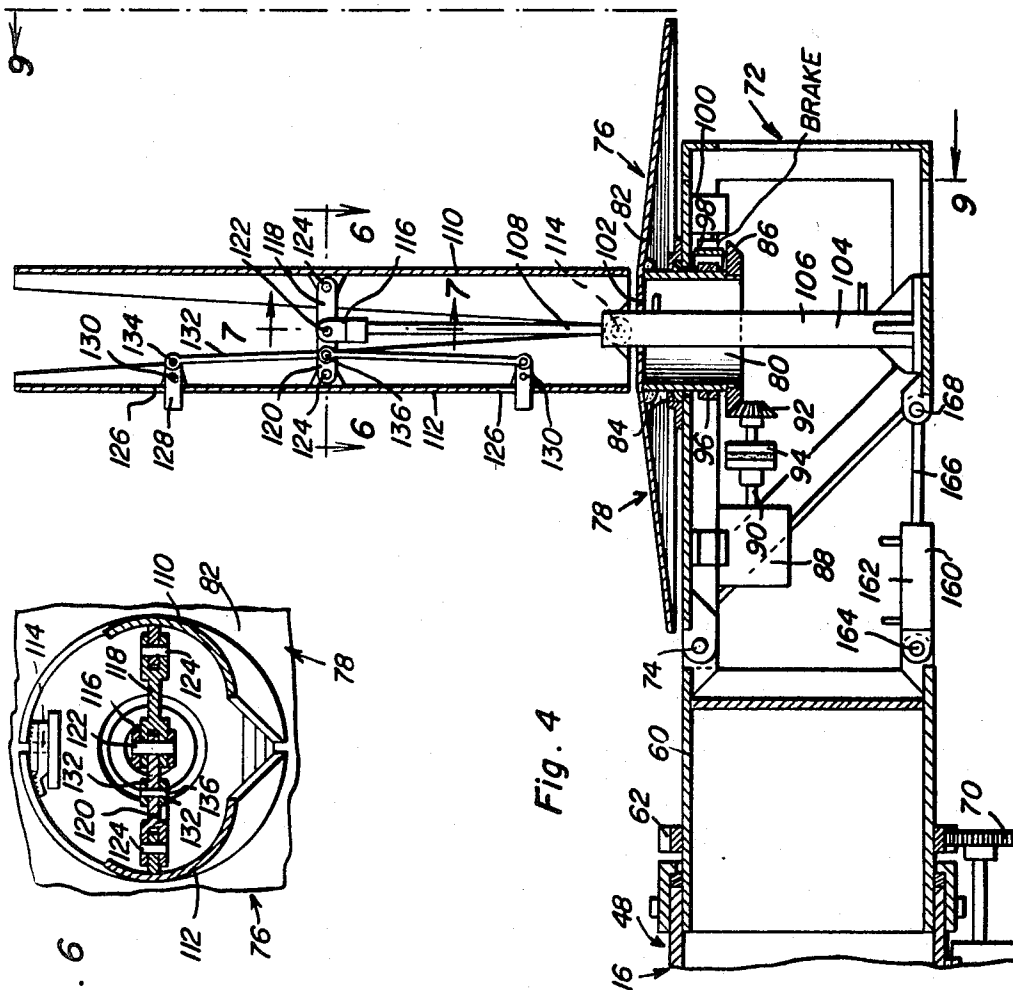


Fig. 4

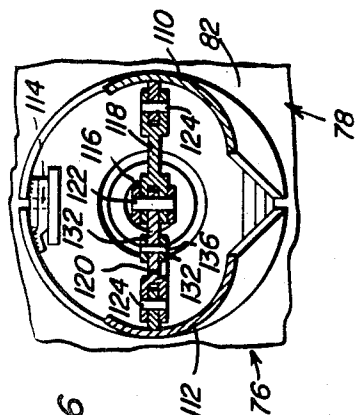


Fig. 6

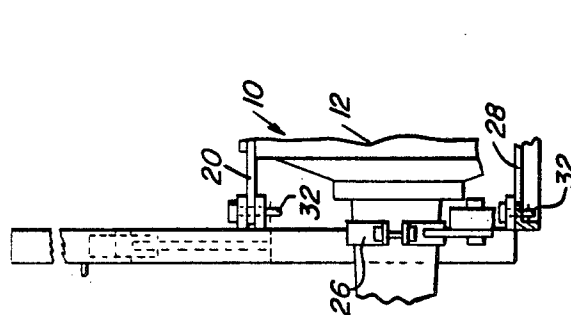


Fig. 7



Fig. 8

Tony F. Rom

INVENTOR.

BY *Alance A. O'Brien*
and *Harvey R. Jackson*
Attorneys

July 30, 1968

T. F. ROM

3,394,903

SNOW FENCE ERECTION AND REWINDING MACHINE

Filed Oct. 21, 1966

4 Sheets-Sheet 4

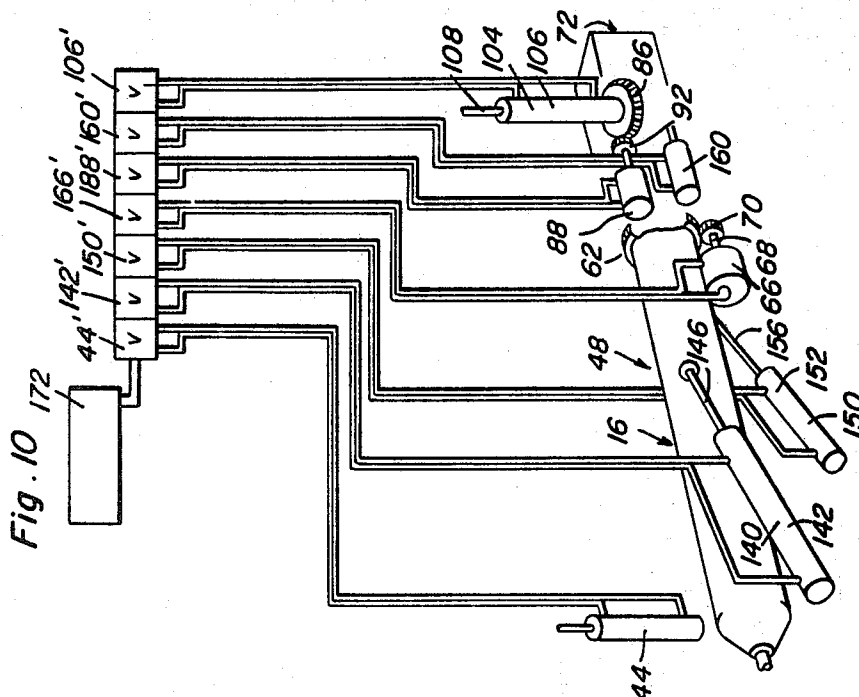


Fig. 10 172

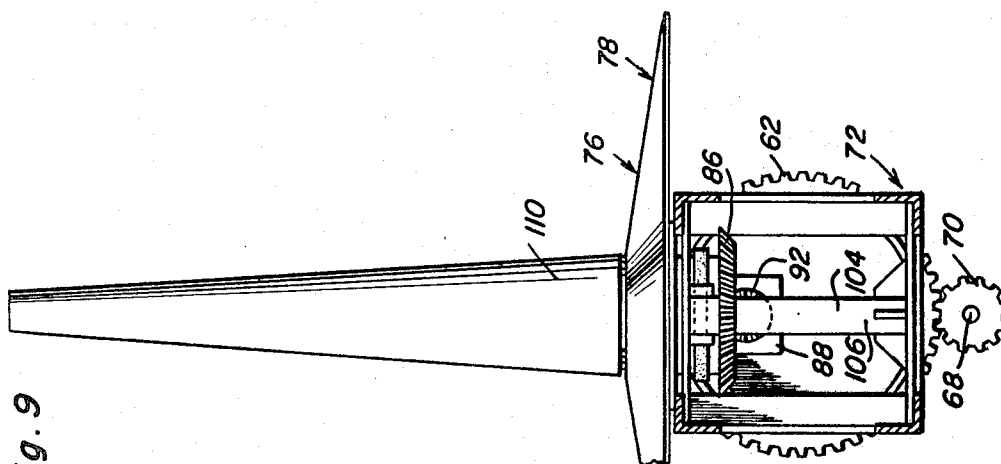


Fig. 9

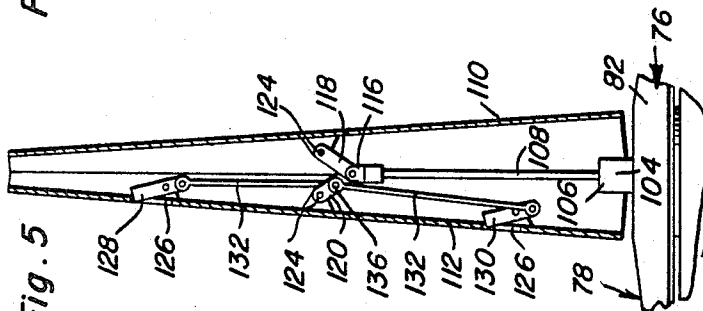


Fig. 5

Tony F. Rom

INVENTOR.

BY *Charles A. O'Brien*
and Harvey B. Jacobson
Attorneys

1

3,394,903

SNOW FENCE ERECTION AND REWINDING MACHINE

Tony F. Rom, Gheen, Minn. 55740

Filed Oct. 21, 1966, Ser. No. 588,382

14 Claims. (Cl. 242—86.5)

ABSTRACT OF THE DISCLOSURE

A ground vehicle adapted to move along a fence line and including an outwardly displaced cantilever supported mount from which a base end of a spool is journaled, the spool including a free end portion adapted to be endwise inserted in an end of a roll of fencing and the mount being supported from the vehicle for swinging movement in both horizontal and vertical planes, oscillation about a horizontal axis extending generally longitudinally of the vehicle and at generally right angles to the axis of rotation of the spool, and oscillation about a vertical axis when the spool is disposed upright.

This invention relates to a novel and useful snow fence erection and rewinding machine adapted to be supported from a farm tractor or the like and to be utilized in handling heavy rolls of snow fencing and the like during erection and rewinding of the fencing.

Snow fencing is customarily stored in large rolls and, when erected, is unrolled from such rolls and secured to suitable supporting fence posts or stakes. Of course, when the snow fencing is to be taken down, it is removed from supporting engagement with the fence posts or stakes and again wound into compact rolls for ease in handling and storage in a compact state.

Conventionally, snow fencing has been transported to the point of erection in rolls light enough to be handled by several men and then unloaded prior to erection of the snow fencing. Thereafter, suitable fencing posts or stakes are erected and individual rolls of the snow fencing are unrolled along the fence line and then the snow fencing is pulled into an upright position and secured to the fence posts or stakes. Of course, conventional dismantling of snow fencing involves a substantial reversal of these steps. In many instances six or more men are needed to handle the heavy rolls of fencing and considerable manual labor is required during stretching of the snow fencing as it is being secured to its supporting fence posts or stakes. Therefore, the erection and disassembly of snow fencing is quite time consuming and expensive due to the excess amount of manual labor required.

The machine of the instant invention has been designed to handle considerably larger rolls of snow fencing than could be handled by six or more men and therefore it is capable of erecting or disassembling longer fence sections at one time. Further, the machine of the instant invention includes means for picking up large rolls of snow fencing lying upon their sides on the ground and for transporting these large rolls of fencing to the fence line where they are to be erected. Further, the machine of the instant invention includes means whereby the large rolls of fencing may be supported in an upright position for rotation about a vertical axis and whereby the fencing may be thereafter unrolled while under tension as the vehicle supporting the machine moves along a fence line. Additionally, the machine of the instant invention includes means whereby a roll of fencing may be supported in an upright position for rotation about its vertical axis and driven about its axis so as to wind the unwound portion of the fencing on the roll as the vehicle

2

supporting the machine moves along a fence line. Finally, the machine of the instant invention further includes means whereby it is adapted to drive as well as pull fence posts or stakes from the ground, the post driving and pulling portions of the machine being operable independently of the fence roll supporting portion of the machine thereby enabling the machine to drive or pull posts as the snow fencing is being erected or dismantled.

The main object of this invention is to provide a snow fence erection and rewinding machine which will be operable to eliminate a major portion of manual labor normally associated with the erection or dismantling of snow fencing.

Another object of this invention is to provide a machine in accordance with the preceding object and which will be adapted to carry heavier rolls of snow fencing than could be carried by several men in a manner such that the individual laths of the snow fencing will not be broken as sometimes happens when rolls of fencing are manually rolled across the ground upon which they rest.

Yet another object of this invention is to provide a machine which will be operable to simultaneously drive or pull fence posts or stakes while unwinding or winding up a roll of snow fencing supported in an upright position.

Still another object of this invention is to provide a machine which will be capable of supporting a large roll of snow fencing in an upright position for rotation about its longitudinal axis and including means whereby a drag may be applied to the roll of fencing being unwound from the machine thereby enabling the fencing to be tensioned and ready for immediate securement to the fence posts as it is unwound from a roll supported from the machine.

A final object of this invention is to provide a snow fence erection and rewinding machine which will conform to conventional forms of manufacture, be of simple construction and easy to operate so as to provide a device that will be economically feasible, long lasting and relatively trouble-free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a fragmentary top plan view of the running gear of a conventional form of farm tractor shown with the snow fence erection and rewinding machine of the instant invention operatively supported therefrom;

FIGURE 2 is a side elevational view of the assemblage illustrated in FIGURE 1 with the outline of a roll of snow fencing being illustrated on the roll supporting portion of the machine in phantom lines and the fence post driving and pulling mechanism operatively associated with a fence post illustrated in phantom lines;

FIGURE 3 is an enlarged fragmentary horizontal sectional view taken substantially upon the plane indicated by the section line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged fragmentary longitudinal vertical sectional view taken substantially upon the plane designated by the numerals 4—4 of FIGURE 1;

FIGURE 5 is a fragmentary sectional view similar to the upper portion of FIGURE 4 but illustrating the core members of the fence roll supporting spool in a collapsed position;

FIGURE 6 is an enlarged fragmentary sectional view taken substantially upon the plane indicated by the section line 6—6 of FIGURE 4;

FIGURE 7 is an enlarged fragmentary sectional view

3

taken substantially upon the plane indicated by the section line 7—7 of FIGURE 4;

FIGURE 8 is a fragmentary transverse sectional view illustrating the manner in which the fence post driving and pulling assembly is supported from the machine and may be operatively associated with a fence post;

FIGURE 9 is a fragmentary sectional view taken substantially upon the plane indicated by the section line 9—9 of FIGURE 4; and

FIGURE 10 is a diagrammatical view of the various hydraulically operated motors and control valves therefor which are utilized on the snow fence erection and rewinding machine.

Referring now more specifically to the drawings the numeral 10 generally designates a conventional form of farm tractor including a rear axle housing generally referred to by the reference numeral 12 from which a pair of rear drive wheels 14 are journaled.

The snow fence erection and rewinding machine of the instant invention is generally designated by the reference numeral 16 and includes a support frame generally referred to by the reference numeral 18 suitably supported from the axle housing or assembly 12 in any convenient manner. The support frame 18 includes an upper support 20 secured to the center of the axle housing 12 in any convenient manner such as by fasteners 22 and a pair of lower support arms 24 secured to opposite sides of the axle housing 12 in any convenient manner such as by clamp assemblies 26. A lower transverse angle member 28 is secured between the rear ends of the support arms 24 and an upstanding frame member 30 is secured between the rear end of the support arm 20 and the rear end of the right support arm 24 by means of pivot pins 32. In this manner, the frame member 30 is pivotally supported from the support frame 18 for swinging movement about an axis defined by the pivot pins 32, the frame member 30 defining an upstanding guide member. The lower end of the frame member 30 has a rearwardly directed and generally horizontal support member or base 34 secured thereto and the upper end of the frame member 30 or guide has one end of a generally horizontal pressure arm 36 slidably engaged therewith, the pressure arm 36 generally paralleling the support base 34. The rear end of the pressure arm 36 includes fence post attaching means in the form of a post engaging hook 38 pivotally supported therefrom for engagement with a fence post or stake 40 and a double-acting hydraulic cylinder 42 has the remote ends of its cylinder and piston portions 44 and 46 secured to the support base 34 and the pressure arm 36.

The machine 16 also includes an elongated support arm or boom generally referred to by the reference numeral 48 which has one end supported from the left side of the axle housing 12 by means of a universal assembly generally referred to by the reference numeral 50 including a bifurcated portion 52 supported from the support arm 48 and a bifurcated portion 54 supported from the axle housing 12, the bifurcated portions 52 and 54 being suitably connected by means of a conventional cross bearing assembly 56 or the like.

The support arm 48 consists of an elongated base and defining a support member 58 and a free end portion, defining a support 60 which is rotatably supported from the support member 58 for rotation about the longitudinal axis of the latter. The support 60 has a ring gear 62 secured thereto and the support member 58 has a fluid motor 66 mounted thereon including a rotatable output shaft 68 having a gear wheel 70 mounted thereon meshed with the ring gear 62. Accordingly, actuation of the reversible fluid motor 66 will effect rotation of the support 60 relative to the support member 58 in the desired direction of rotation.

Further, the support arm 48 also includes a mount or mounting frame generally referred to by the reference numeral 72 which is pivotally supported from the support 60 by means of a pivot fastener 74 and a winding spool

4

assembly generally referred to by the reference numeral 76 is rotatably journaled from the mount or mounting frame 72.

The spool winding assembly 76 includes a base end member referred to in general by the reference numeral 78 consisting of a main support sleeve 80 rotatably journaled from the mounting frame 72 and having a spool flange member 82 secured thereto. The sleeve 80 is journaled from the mounting frame 72 by means of a bearing assembly 84 and has a beveled ring gear 86 mounted thereon. A fluid motor 88 including a rotatable output shaft 90 is supported from the mounting frame 72 and a bevel gear 92 meshed with the ring gear 86 is driven from the output shaft 90 through a clutch mechanism 94 which may be either manually actuated or of the automatic type so as to be operable to allow free wheeling of the sleeve 80 independent of the fluid motor 90 whenever desired.

The sleeve 80 is further provided with brake lining means 96 and brake shoe means 98 which may be shifted into and out of engagement with the brake lining means 96 by means of a suitable hydraulically or otherwise controlled brake actuator 100.

The spool flange member 82 is centrally apertured as at 102 and the base end of the cylinder portion 104 of a double-acting and extendible fluid motor 106 is secured to the mounting frame 72 and projects through the aperture 102. The fluid motor 106 includes an extendible piston rod portion 108 which may of course be extended or retracted as desired upon actuation of the fluid motor 106.

A pair of elongated and generally parallel spool core members 110 and 112 are pivotally supported at one pair of corresponding ends from the spool flange member 82 by means of pivot pins 114 and the other pair of corresponding ends of the core members 110 and 112 are therefore swingable toward and away from each other. The free end of the piston rod portion 108 includes a bifurcated end portion 116 between whose furcations corresponding ends of a pair of connecting links 118 and 120 are pivotally secured by means of a pivot fastener 122. The other pair of ends of the connecting links 118 are pivotally secured to the core members 110 and 112 by means of pivot fasteners 124 and accordingly, it may be seen that extension and retraction of the piston rod portion 108 will effect movement of the end portions of the core members 110 and 112 remote from the spool flange member 82 toward and away from each other.

The core members 110 and 112 are generally semi-cylindrical in configuration and the core member 112 is provided with a pair of longitudinal slots 126 through which one pair of corresponding ends of a pair of roll retaining levers 128 are swingable, the levers 128 being pivotally supported from the core member 112 as at 130. The other pair of corresponding ends of the roll retaining levers 128 have corresponding ends of a pair of connecting levers 132 pivotally secured thereto as at 134 and the other pair of corresponding ends of the connecting levers 132 are pivotally secured to the connecting link 120 by means of a pivot fastener 136. Therefore, it may be seen that when the ends of the core members 110 and 112 remote from the spool flange member 82 are shifted from closely adjacent positions to the positions spaced further apart illustrated in FIGURE 4 of the drawings the roll retaining levers 128 will automatically be swung relative to the core member 112 so as to have the ends thereof remote from the pivot fasteners 134 extended outwardly of the slots 126 for engagement with the roll of snow fencing disposed on the core members 110 and 112.

With attention now directed more specifically to FIGURES 1 and 2, a large double-acting and extensible fluid motor 140 is universally supported at the base end of its cylinder portion 142 from the right side portion of the axle housing 12 as at 144. The free end of the piston rod portion 146 of the fluid motor 142 is universally secured to the rear end portion of the base end 58 of

5

the support arm 48 as at 148. Further, a smaller double-acting and extendible fluid motor 150 has the base end of its cylinder portion 152 swivelly supported from the angle member 28 as at 154 and the free end of its piston rod portion 156 swivelly supported from the base end 58 of the support arm 48 as at 158.

With attention now directed more specifically to FIGURE 7 of the drawings it may be seen that the bifurcated end portion 116 is rotatably supported from the end of the piston rod portion 108 remote from the cylinder portion 104 whereby the core members 110 may be rotated about the axis of rotation of the support sleeve 80 independent of rotation of the piston rod portion 108. Further, a fluid motor 160 has the base end of its cylinder portion 162 pivotally supported from the support 60 by means of a pivot fastener 164 and the free end of its piston rod portion 166 pivotally secured to the mounting frame 72 by means of a pivot fastener 168.

With attention now invited more specifically to FIGURE 10 of the drawings it may be seen that the various fluid motors 44, 66, 88, 106, 142, 150 and 160 are each suitably communicated with a control valve designated by corresponding prime numerals and that each of the control valves is suitably communicated with a supply of fluid under pressure designated by the reference numeral 172. Of course, it is to be noted that supply 172 will include a suitable hydraulic fluid reservoir and a hydraulic fluid pump including an outlet communicated with the various valves and also that the various valves will be communicated with the fluid reservoir by means of suitable return lines.

In operation, a plurality of large rolls of snow fencing may be transported to the erection site by any suitable means such as by a truck. Then, after the large rolls of snow fencing have been unloaded from the truck and placed upon the ground, the tractor 10 may be moved along one side of the rolls with the core members 110 and 112 retracted. Then, the fluid motors 142, 150 and 160 may be suitably actuated to cause the collapsed core members 110 and 112 to be inserted into one end of the roll of snow fencing which is to be lifted. Then, the core members 110 and 112 may be swung to their extended positions illustrated in FIGURE 4 of the drawings at which point they will tightly engage the innermost convolution of the snow fencing while the roll retaining levers 128 are extended for further engagement with the snow fencing to prevent rotation of the roll of snow fencing relative to the spool winding assembly 76 as well as axial displacement of the roll of snow fencing off the free ends of the core members 110 and 112. Then, the motor 66 may be actuated to swing the spool winding assembly 76 to an upright position and the roll of snow fencing supported from the assembly 76 may then be transported to the desired location for erection of the snow fencing. As soon as the free end of the snow fencing supported from the assembly 76 is attached to the desired fence posts or stakes 40, the clutch 94 may be disengaged to enable free wheeling of the sleeve 80. Then, with the brake actuator 100 actuated so as to apply the desired amount of drag on the support sleeve 80, the tractor 10 may be moved along the fence line so as to unroll the snow fencing in a tensioned condition for ready attachment to the line posts or stakes 40. Of course, as the tractor 10 moves along the fence line, each individual stake or post 40 is driven into the ground by the fluid motor 44, the posts or stakes 40 each being driven into the ground by first supporting the stakes 40 from the hook member 38 in the manner illustrated in FIGURE 2 of the drawings and then actuating the cylinder 44 so as to cause downward movement of the pressure arm 36.

After each roll of fencing is secured to the stakes or posts 40, the tractor 10 may of course return to the point at which the fence rolls were unloaded from the truck and pick up the next roll of fencing to be erected.

6

When it is desired to dismantle the fencing, the first end section of fencing dismantled from a post or stake may be suitably secured to the assembly 76 and the latter may then be caused to rotate as desired by the fluid motor 88 in order to wind the snow fencing on the assembly 76. The tractor 10, when disassembling snow fencing, may be moved in either a forward direction or in a rearward direction and each fence post with which the pressure arm 36 is aligned may be pulled from the ground by securing the hook member 38 thereabout and causing upward movement of the pressure arm 36 by means of the fluid motor 42.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A snow fence handling machine comprising a spool including a base end member defining a spool center axis and adapted to be supported from a suitable mount, said spool including a plurality of elongated generally parallel spool core members generally paralleling and circumferentially spaced about said axis and pivotally supported from said base end member at one set of corresponding ends for limited swinging movement of the other set of ends generally radially of said axis between collapsed positions with said core members convergent toward said other set of ends thereof and expanded positions with said other set of ends shifted radially outwardly of said center axis from said collapsed positions, means operative to oscillate said core members relative to said base end member between said collapsed and expanded positions, said other set of ends being free of portions thereof projecting outwardly therefrom radially of said axis, whereby said core members, when collapsed may be inserted lengthwise into the center of a roll of fencing material in a self-centering manner.

2. The combination of claim 1 wherein at least one of said core members includes roll engaging means mounted thereon intermediate its opposite ends for movement between radially outwardly projecting extended positions and retracted positions relative to said one core member, and means connected between said core members operative to automatically extend and retract said roll engaging means in response to movement of said other set of ends of said core members radially outwardly from and radially inwardly toward said axis, respectively.

3. The combination of claim 1 including a mount from which said base end member is journaled for rotation about said center axis, and motor means operatively connected between said mount and said base end member for effecting rotation of said end member relative to said support.

4. The combination of claim 1 including a mount from which said base end member is journaled for rotation about said center axis, and brake means connected between said base end member and said mount operative to impart a variable drag on said base end member against its rotation relative to said mount.

5. The combination of claim 1 including a mount from which said base end member is journaled for rotation about said center axis, and brake means connected between said base end member and said mount operative to impart a variable drag on said base end member against its rotation relative to said mount, and motor means operatively connected between said mount and said base end member for effecting rotation of said base end member relative to said mount.

6. The combination of claim 1 wherein said machine also includes a mobile platform adapted to move along a path, means supporting said base end member from said

7

platform for oscillation of said base end member about an axis generally paralleling said path and between a first position with said center axis disposed upright and a second generally horizontal position extending transversely of said path, the last-mentioned means also including means supporting said base end member for horizontal swinging movement transversely of said path.

7. The combination of claim 6 wherein the last-mentioned means includes a mount from which said base end member is supported, a support, said mount being supported from said support for oscillation relative thereto about an axis disposed at generally right angles relative to the longitudinal center axis of said spool.

8. The combination of claim 7 including a supporting member from which said support is supported for rotation about an axis disposed at generally right angles relative to said center axis and the axis of rotation of said mount relative to said support.

9. The combination of claim 8 wherein said supporting member comprises a support arm including a base end and a free end from which said support is journaled, the axis of rotation of said support relative to said supporting member generally paralleling said support arm, said mobile platform comprising a ground vehicle whose longitudinal axis generally parallels said path, and means universally supporting said base end of said arm from said vehicle with said arm generally paralleling the longitudinal axis of said vehicle.

10. The combination of claim 9 wherein the free end of said arm projects rearwardly of said vehicle.

11. The combination of claim 10 including means operatively connected between said vehicle and said arm operative to oscillate said arm through a vertical plane generally paralleling said arm and a plane disposed generally normal to said vertical plane and also generally paralleling said arm.

12. The combination of claim 6 including a mount from which said base end member is supported, a support arm, one end of said support arm being universally sup-

8

ported from one end of said platform for vertical and horizontal swinging of the free end of said arm, said mount being carried by the free end of said arm, means operatively connected between said platform and said arm operative to oscillate said arm through vertical and horizontal planes generally paralleling said arm.

13. A fence handling machine comprising a ground vehicle, a boom projecting endwise outwardly from one end of said vehicle with the base end of said boom supported for swinging movement of the free end of said boom both vertically and horizontally, means operatively connected between said vehicle and said boom for adjustably swinging the free end of said boom both vertically and horizontally, a support carried by the free end of said boom and angularly adjustable relative to said boom about an axis generally paralleling said boom, and a spool having a base end journaled from said support for rotation about an axis extending transversely of said boom and including a free end adapted to be endwise inserted into one end of a roll of fencing.

14. The combination of claim 13 including a mount supported from said support for oscillation about an axis generally normal to the longitudinal center line of said boom, said base end of said spool being journaled from said mount.

References Cited

UNITED STATES PATENTS

892,287	6/1908	Morse	242—72.1
1,443,450	1/1923	Yurcich	242—110.2
1,827,855	10/1931	Parker	242—110.2
2,616,636	11/1952	Aden	242—86.5
2,677,476	5/1954	Bebinger.	
2,914,270	11/1959	Parker et al.	242—86.5
3,079,129	2/1963	Hulburt	242—86.5 X
671,248	4/1901	Thomann et al.	242—86.7

STANLEY N. GILREATH, *Primary Examiner*.

N. L. MINTZ, *Assistant Examiner*.