United States Patent

[11] 3,628,505

[72] Inventor Lawrence A. Myers
Milford, Ind.

[21] Appl. No. 24,431
[22] Filed Apr. 9, 1970
[45] Patented Dec. 21, 1971
[73] Assignee Chore-Time Equipment, Inc.
Milford, Ind.
Continuation of application Ser. No. 718,677, Apr. 4, 1968, now abandoned. This application Apr. 9, 1970, Ser. No. 24,431

[54] OVERHEAD WINCH CONSTRUCTION
5 Claims, 6 Drawing Figs.

[52] U.S. Cl. 119/61, 119/52, 254/150, 254/187
[51] Int. Cl. A01k 5/00
[50] Field of Search ..... 254/144, 150, 186, 187, 148; 119/52 X, 61 R

[56] References Cited

UNITED STATES PATENTS

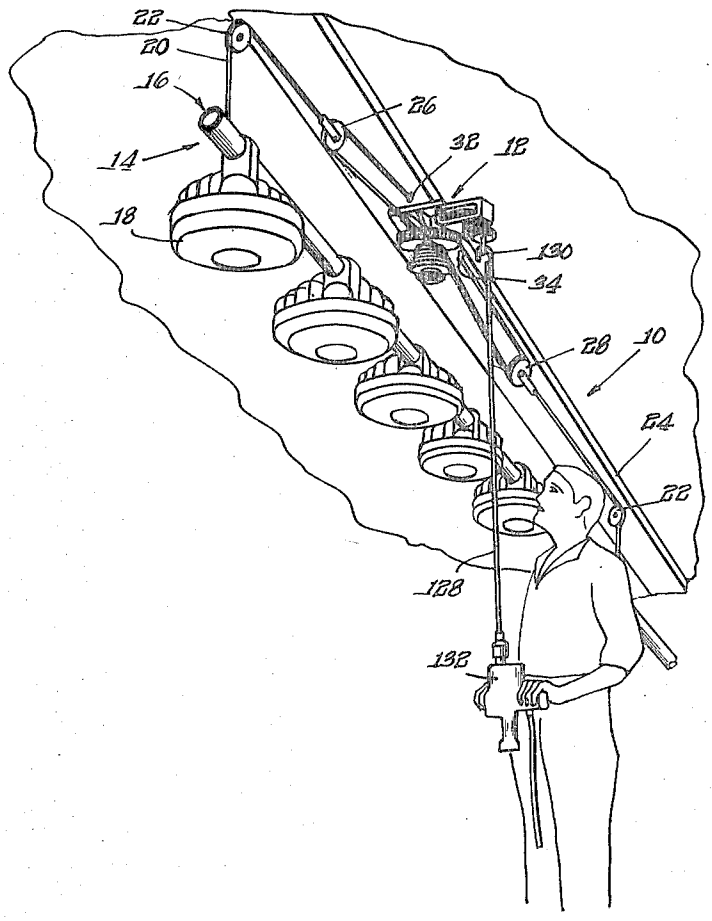
2,579,681	12/1951	Leitner	254/144
2,882,013	4/1959	Margetts	254/186
3,168,955	2/1965	Black	254/148
3,485,215	12/1969	Scott	119/52 R

FOREIGN PATENTS

604,692	7/1948	Great Britain	254/150

Primary Examiner—Harvey C. Hornsby
Attorney—Olson, Trexler, Walters and Bushnell

ABSTRACT: There is disclosed a winch construction for vertically adjustably supporting an apparatus such as a mechanical poultry feeder and comprising a frame mountable at an overhead position and having a vertically disposed drum and a drive shaft connected by gearing, automatically operable means for releasably locking the drive shaft, which means and shaft are constructed for enabling an operator located beneath the winch to actuate the winch manually or with the aid of a portable motor or electric drill.



PATENTED DEC 21 1971

3,628,505

SHEET 1 OF 2

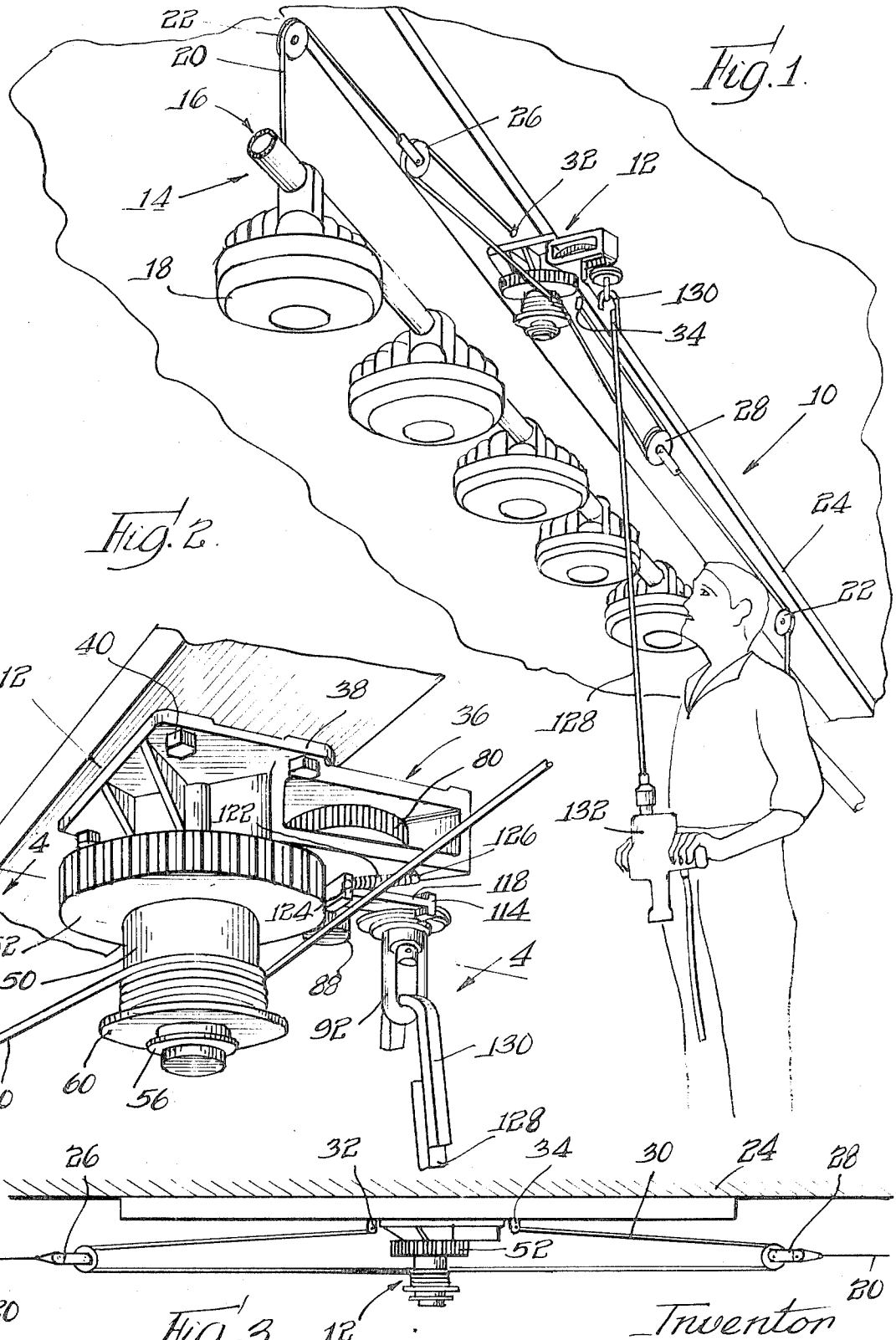


Fig. 1.

Fig. 2.

Fig. 3.

Inventor
Lawrence A. Myers
By: Olsen, Treyler, Wolters & Bushnell attys.

Fig. 4.

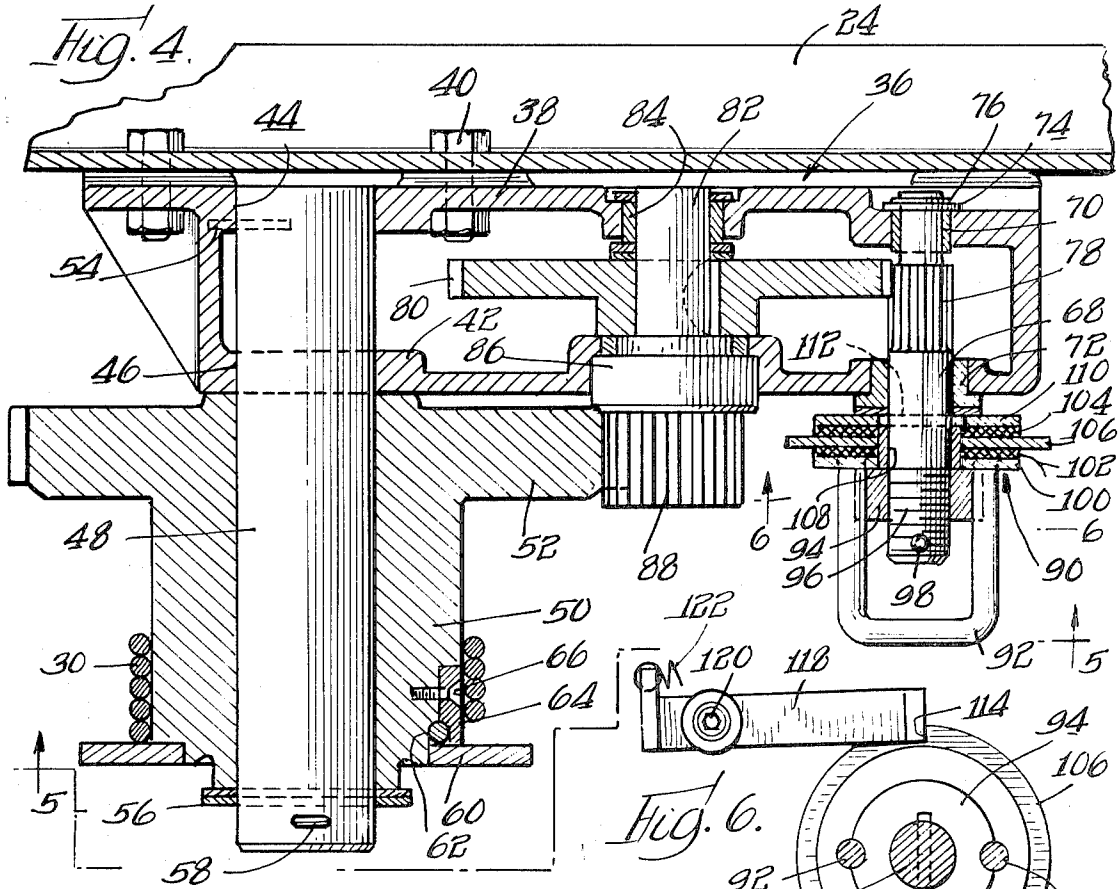
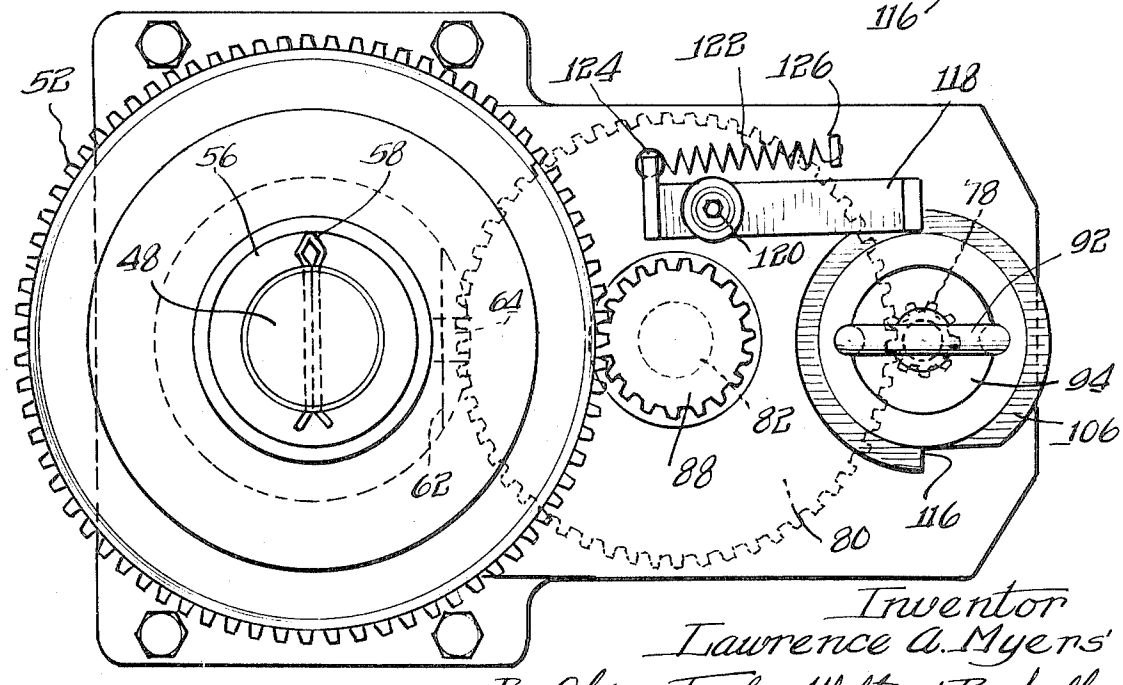


Fig. 6.

Fig. 5.



Inventor
Lawrence A. Myers
By Olson, Trexler, Wolters & Bushnell Attys.

OVERHEAD WINCH CONSTRUCTION

This application is a continuation of 718,677, filed Apr. 4, 1968, now abandoned.

The present invention relates to a novel winch construction and more specifically to a novel winch construction especially suitable for use in adjustably supporting animal feeding apparatus.

As is known, it has been found to be advantageous to support feeder apparatus for poultry, hogs and the like in a manner which enables the apparatus to be vertically adjusted for accommodating animals of different sizes and/or for facilitating cleaning and servicing of the apparatus and the building in which the apparatus is installed.

In accordance with one practice, such feeders have been suspended from cables extending overhead pulleys and operatively connected with a winch mounted on a vertical post or wall at a convenient location. While such systems have in many instances, been generally satisfactory, they have usually required mounting at one end of the apparatus creating problems in suspension and operation.

It is an important object of the present invention to provide a novel winch adapted to be mounted at an overhead location and at a location between opposite ends of the apparatus to be supported and constructed for facilitating easy operation by workmen positioned beneath the winch.

A more specific object of the present invention is to provide a novel winch structure having automatic locking means for retaining the winch at any adjusted desired position, which winch is constructed so as to be operable by a workman standing at a remote location and utilizing a manually positionable connecting rod or drive shaft.

A further specific object of the present invention is to provide a novel winch structure adapted to be mounted at an overhead location and having a substantially vertically disposed takeup drum connectable with the mid portion of a cable or the like to be wound thereon, a substantially vertically disposed drive shaft operatively interconnected with the drum through gearing, and an automatically operable locking mechanism or brake structure for retaining said shaft in any desired adjusted position.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings wherein:

FIG. 1 is a fragmentary perspective view showing the manner in which a winch structure incorporating features of the present invention may be utilized for suspending an apparatus such as a mechanical poultry feeder for vertical adjustment;

FIG. 2 is an enlarged perspective view showing the winch structure of FIG. 1;

FIG. 3 is a fragmentary side elevational view of the poultry feeder suspension system shown in FIG. 1;

FIG. 4 is an enlarged partial sectional view taken generally along line 4—4 in FIG. 2;

FIG. 5 is a sectional view taken along line 5—5 in FIG. 4; and

FIG. 6 is a fragmentary sectional view taken along line 6—6 in FIG. 4.

Referring now more specifically to the drawings wherein like parts are designated by the same numerals throughout the various figures, an installation 10 including a winch structure 12 constructed in accordance with features of the present invention is shown in FIGS. 1–3. It is to be understood that the winch unit 12 may be adapted and installed for supporting numerous types of devices and apparatus. However, for the purpose of illustrating one embodiment of the present invention, the installation 10 is shown as including an elongated mechanical poultry feeder apparatus 14.

The apparatus 14 is of known construction and need not be described in detail. It suffices to state that, in the embodiment shown, the apparatus includes an elongated conveyor tube 16 having a plurality of feed dispensing pan assemblies 18 connected thereto and suspended therefrom. As will be understood, suitable means operates within the tube 16 for

delivering feed from a hopper or other source, not shown, to the successive pan assemblies 18.

The feeder 14 is supported for vertical adjustment by flexible elements or cables 20 operatively connected with the winch 12. In the embodiment shown, the winch is located generally midway between opposite ends of the feeder 14 and the cables or flexible elements 20 are spaced along and connected to the feeder and extend upwardly over pulleys 22 suitably connected to an overhead support or beam 24. The cables 20 are connected with pulley assemblies 26 and 28 at opposite sides of the winch. Another cable 30 has opposite ends secured to anchors 32 and 34 at opposite sides of the winch. Cable 30 extends around both of the pulleys 26 and 28 and has a midportion connected to the winch in the manner described below.

The winch unit 12 comprises a housing 36 with a foot or baseplate portion 38 adapted to be mounted against the underside of the beam 24 or other overhead support member by means of a plurality of screws or bolts 40.

As shown best in FIG. 4, the housing 36 has a wall portion 42 spaced axially from the portion 38 and these portions respectively have sockets 44 and 46 in axial alignment for receiving and retaining a vertically disposed shaft 48. The shaft projects downwardly from the wall portion 42 for rotatably receiving and supporting a drum 50 and a gear 52. In the embodiment shown, the drum and gear are integrally formed as a single member.

The shaft 48 is fixed against axial and rotative movement relative to the base or housing by means of pin 54. The drum and gear member is rotatable relative to the shaft 48 and is supported thereon by a thrust bearing 56 engageable with the lower end of the drum 50 and secured in position by a cotter pin 58 or other suitable means. An annular flange 60 is fixed to the lower end of the drum 50 and cooperates with the radially projecting gear in providing the drum with flanges at its opposite end for retaining the cable thereon.

As previously indicated, a midportion of the cable 30 is connected with the drum 50. Thus, upon rotation of the drum, the cable winds thereon from opposite directions as shown in FIG. 2. In order to connect the cable to the drum, a flat or groove 62 is formed in one side of the drum as shown in FIGS. 4 and 5 for receiving a portion of the cable. The cable is clamped within the groove by an element 64 which is secured by a screw 66.

In order to actuate the drum 50, the winch unit 24 is provided with an input drive shaft 68 rotatably supported in axially spaced bearings 70 and 72 mounted in wall portions of the housing or base frame 36. The bearing 70 has an annular flange or thrust portion 74 overlying an upper side of the housing or engageable with a ring 76 secured to the shaft for preventing downward axial movement of the shaft.

The shaft 68 is formed with an integral gear or pinion 78 which pinion meshes with a gear 80 keyed or otherwise fixed to a rotatable shaft 82 rotatably supported by bearings 84 and 86 in the housing. The shaft 82 is parallel to the previously mentioned shafts 48 and 68 and carries at its outer end a pinion 88 which meshes with and drives the drum gear 52.

Brake and driver means 90 is connected with a downwardly extending portion of the shaft 68 for releasably locking the shaft and thus the drum 50 in any desired adjusted position and for permitting the winch to be operated by a workman in the manner shown in FIG. 1. The means 90 comprises a connector element or generally U-shaped yoke member 92 having opposite legs secured to a nut 94 turned on to a threaded end portion 96 of the shaft 68. A pin 98 or other suitable stop means is fixed to the outer end of the shaft for preventing the nut from being completely removed therefrom.

The nut 94 is adapted to bear against a disc pack on the shaft 68. This disc pack comprises an annular metal washer or disc 100, friction washers 102 and 104 and a ratchet disc 106 between the friction washers. These washers or discs encircle a sleeve bearing 108 around the shaft so that they are normally rotatable relative to the shaft. In addition another metal disc

or washer **110** is disposed for abutting engagement with the friction washer **104**. The washer **110** is fixed to the shaft by a pin **112** or other suitable means so as to rotate in unison with the shaft.

As shown in FIGS. **5** and **6**, the ratchet washer or disc **106** has oppositely disposed teeth **114** and **116** adapted to be engaged by a finger or pawl **118**. The pawl is pivotally mounted on pin **120** secured to the housing **36**. A spring **122** is connected with the pawl at **124** and with an anchor **126** for biasing the pawl in a clockwise direction as viewed in FIG. **5** for engagement with the ratchet disc **106**.

In order to enable an operator to actuate the winch as shown in FIG. **1**, an elongated drive shaft **128** is provided. This shaft is formed with coupling means **130** at its upper end, which coupling means is complementary to the yoke or drive element **92**. In the embodiment shown, the coupling means comprises a hook portion adapted to be removably inserted through the U-shaped yoke element **92**. It is contemplated that the drive shaft **128** may be driven by a handcrank or a manually portable motor unit **132** which, as shown in FIG. **1**, may be an electric drill having a reversible motor of known construction. In other words, the drive shaft **128** may be inserted into the chuck of the drill so that the operator may easily drive the element **92** in the desired direction.

The brake and drive means **90** functions in the following manner. The disc pack is normally clamped between the nut **94** and the washer **110** fixed to the shaft **68** so that the ratchet disc **106** is normally locked against rotation relative to the disc **110**. At the same time the pawl **118** engages the ratchet disc so as to prevent rotation thereof in a counterclockwise direction as viewed in FIGS. **5** and **6** and this, of course, prevents the disc **110** from rotating in a counterclockwise direction and thus the winch drum is locked against rotation at the desired adjusted position. The weight of the feeder structure or other apparatus supported by the winch normally biases the winch in a counterclockwise direction as viewed in FIG. **5** so that there is a normal tendency to drive the shaft **68** through the gearing in a counterclockwise direction and this tendency keeps the disc pack under pressure and the brake locked so that such rotation is prevented in the manner previously described.

When it is desired to actuate the winch for raising the feeder, the operator hooks the drive shaft **128** over the yoke or drive element **92** and actuates the electric motor for rotating the yoke **92** in a clockwise direction as viewed in FIGS. **5** and **6**. This action causes the nut **94** to tighten against the disc **100** so that all of the discs are locked against the disc **110**. As a result, the yoke **92**, the disc pack and the drive shaft **68** become in effect, a unitary drive member and the shaft **68** is driven in a clockwise direction, which movement is not restricted by the pawl **118**. This rotation of the shaft **68** causes the drum **50** to be driven in a clockwise direction for winding the cable **30** onto the drum and thus raising the feeder apparatus.

When the feeder apparatus has been raised to the desired level, the motor unit **132** is deenergized so that the driving torque in the clockwise direction is no longer applied to the yoke **92**. The weight of the apparatus immediately tends to rotate the drum **50** and thus the shaft **68** in a counterclockwise direction, but since the members of the disc pack are tightly clamped together and locked with respect to the shaft **68**, such rotation is prevented by the pawl **118**.

When it is desired to lower the feeder apparatus from the elevated position, the operator actuates the motor unit **132** for driving the shaft **128** and thus the yoke **92** in a reversed or counterclockwise direction as viewed in FIGS. **5** and **6**. This initially causes the nut **94** to rotate relative to the shaft **68** and advance outwardly along the threaded portion **96** thereof for backing away from and releasing the clamping pressure on the disc pack. As a result the frictional lock between the discs **102** and **104** and the ratchet disc **106** is released so that the shaft **68** is free to rotate relative to the ratchet disc in a counterclockwise direction. As previously indicated, the weight of the feeder apparatus tends to drive the drum and thus the shaft **68** in a counterclockwise direction and since the shaft is now free to rotate, the drum rotates and the apparatus is lowered. When the motor unit **132** is stopped, rotation of the nut **94** is also stopped and further rotation of the shaft **68** in the counterclockwise direction causes the disc pack to be clamped against the nut for locking the shaft **68** and thus holding the feeder apparatus in the desired lowered position.

While a preferred embodiment of the present invention has been shown and described herein, it is obvious that many structural details may be changed without departing from the spirit and scope of the appended claims.

I claim:

1. A suspension system comprising: an elongate, horizontally extending feeder apparatus including a delivery tube and a plurality of feeder pans, and apparatus being movable between a raised position and a lowered position; a winch structure mounted above and intermediate opposite ends of said apparatus for supporting and moving said apparatus between said positions, said structure including frame housing means mounted on the underside surface of an overhead support member, a feeder apparatus supporting shaft mounted at one end to and within said frame housing means and extending along a first vertical axis, and supporting shaft extending vertically out of and beneath said frame housing means and supporting thereon drum means outside of and beneath said frame housing means adapted for supporting said feeder apparatus; a rotatable input shaft mounted at one end to said frame housing means for rotation about a second vertical axis, said input shaft extending vertically out of and beneath said frame housing means; coupling means interconnecting said drum means and said input shaft for rotation in unison; a driven member mounted on said input shaft for limited movement therealong in response to the application of torque, and releasable brake and locking means disposed exteriorly of said housing and carried in surrounding engagement with said input shaft and disposed above said driven member, means for applying torque to said driven member such that upon the application of torque in one direction, said driven member is advanced upwardly along the input shaft to engage and actuate the releasable brake and locking means, thereby locking said driven member, said brake and locking means, said input shaft, and said drum means for joint rotation in response to the continued application of torque in said one direction, the application of torque to said driven member in the opposite direction causing said driven member to be retracted downwardly and disengaged from the brake and locking means, thereby releasing said brake and locking means to permit said input shaft and drum means to rotate independent of said brake and locking means, means limiting the retractive movement of said driven member whereby said brake and locking means will be automatically reengaged upon the cessation of the application of torque in said opposite direction to said driven member; and a pulley arrangement operatively coupled with said winch for effecting raising and lowering of said feeder apparatus; said pulley arrangement including, an elongate flexible element having a midportion thereof wound upon said drum means, with oppositely extending portions of said element having free ends anchored to said overhead support member, a pair of pulley members over which said oppositely extending portions are engaged, and cable means connecting said pulley members to respective end sections of said feeder apparatus, so that upon rotation of the drum means in one direction, said oppositely extending portions of the flexible element are simultaneously wound up on said supporting shaft for raising said feeder apparatus, and upon rotation of said drum means in the opposite direction, said oppositely extending portions are simultaneously unwound from said supporting shaft for lowering the feeder apparatus.

2. A suspension system according to claim **1** wherein said means for applying torque to the driven member includes a coupling element fixedly carried by said driven member, and

an elongate, vertically extending drive shaft disengageably connected at its upper end to said coupling element and adapted for connection at its lower end to a source of power.

3. A suspension system according to claim 2 wherein said source of power includes reversible motor means for applying torque in said one direction, as well as said opposite direction.

4. A suspension system according to claim 1 wherein said input shaft has an elongate screw thread formed thereon, said driven member comprising a complementary threaded element engaged with said screw thread and being axially shiftable relative to said thread between a first position for engaging and actuating the brake and locking means, and a second position axially spaced downwardly from said first position for releasing said brake and locking means.

5. A suspension system according to claim 4 wherein said brake and locking means include a first annular member fixed to said input shaft, a second annular member slidably mounted on said input shaft and disposed below and spaced from said first annular member and being engaged by said driven member, a ratchet element rotatably disposed on said input shaft intermediate said first and second annular members, friction discs disposed between said ratchet element and said first and second annular members, respectively, such that upon upward movement of the driven member, said first and second annular members, the ratchet element, the friction discs and said driven element will be locked for joint rotation transmitting to the input shaft the torque applied to said driven member, and pawl means carried by said frame and engageable with the ratchet element permitting rotation of said element in one direction only.

* * * * *