Oct. 7, 1958 B. S. DRUMMOND 2,855,072

HOIST

Filed June 28, 1955 2 Sheets-Sheet 1

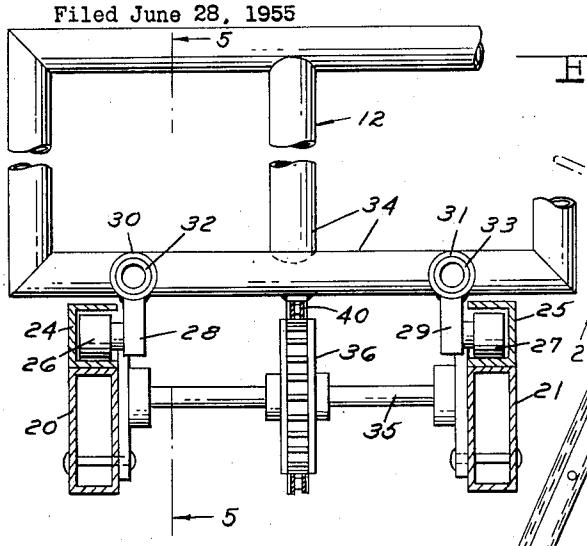


FIG. 2

FIG. 3

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Oct. 7, 1958 B. S. DRUMMOND 2,855,072

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Filed June 28, 1955 2 Sheets-Sheet 2

FIG. 4

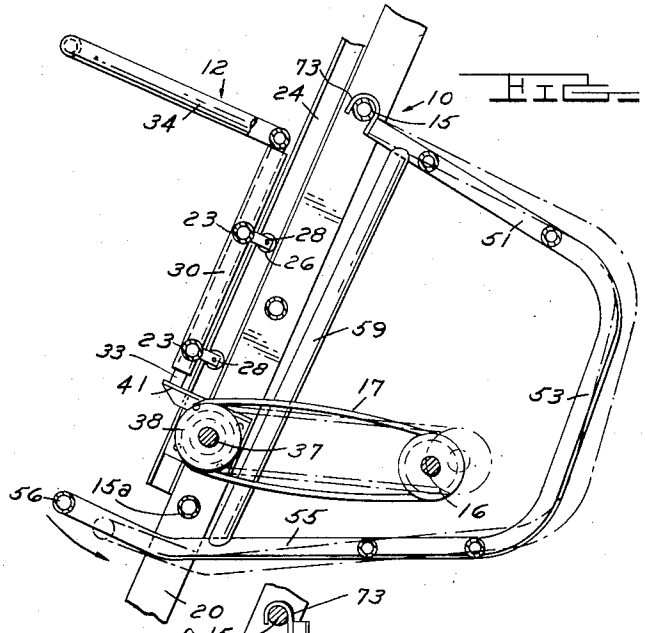


FIG. 7

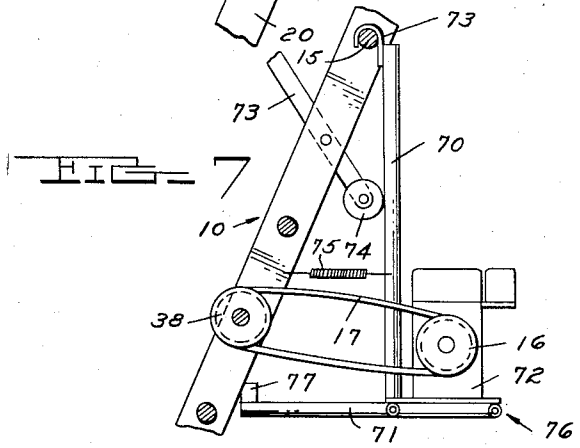


FIG. 5

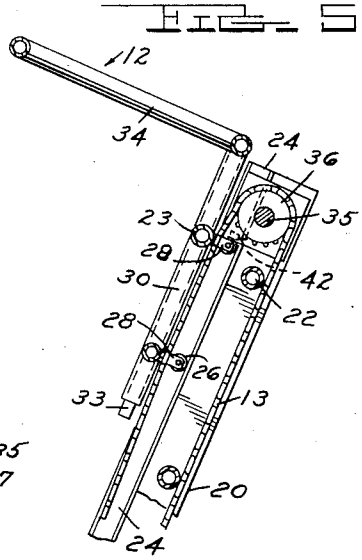
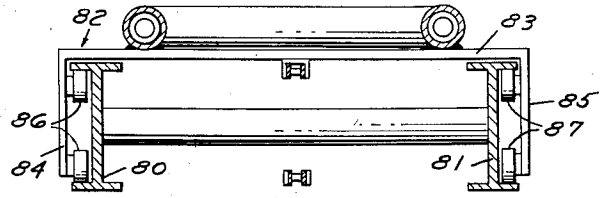


FIG. 6



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HOIST

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Application June 28, 1955, Serial No. 518,493

5 Claims. (Cl. 187—10)

This invention relates to an easily portable hoist device and particularly pertains to an easily demountable motor driven unit in conjunction with an easily handled track unit for elevating and lowering material such as shingle bundles and other building materials in construction work.

Portable elevators such as ladder hoists have been employed heretofore to facilitate the raising and lowering of items such as building materials in constructing buildings, however, the several devices of the prior art have not proven entirely satisfactory inasmuch as they are complicated in design and construction, expensive to manufacture, and difficult to transport, set up, and maintain.

With the foregoing in view, the primary object of the invention is to provide a mountable and demountable power unit which is easily associated with a track unit such as a ladder which is simple in design and construction, inexpensive to manufacture, easy to use, easy to maintain, easy to mount and dismount, easy to transport, and efficient and effective to use.

An object of the invention is to provide a separate track and removable platform device such as a ladder with an endless belt and lineal movable detachable platform thereon.

An object of the invention is to provide a power unit which is easily mountable and demountable on the track device to effectively raise and lower the platform thereon.

An object of the invention is to provide a hoist assembly which can be operated, installed, and removed with ease by the ordinary operator or amateur with very little instruction and experience.

An object of the invention is to provide a power unit which is swingably or rockably hung on the track element by easily associated means such as a hooking arrangement for easy mounting and dismounting.

An object of the invention is to provide a hoist power unit so integrated with the track unit that the drive means between the power unit and the track unit is normally in non-driving relationship such as by a loose belt so that when the rockably hung power unit is swung outwardly of the track unit, the belt tightens to drive the hoist mechanism in the track unit to elevate the platform.

An object of the invention is to provide a slippable drive between the power unit and the track unit so that the platform can be braked or clutched in raising or in its gravity descent by regulating the manual pressure placed on swinging the power unit incident to selectably tighten the belt.

These and other objects of the invention will become apaprent by reference to the following description of the hoist embodying the invention taken in connection with the accompanying drawings in which:

Fig. 1 is a side elevational view of the track and power unit combination inclined against a building showing the elevated position of the platform, the outwardly swung position of the power unit to impart power to the track unit, and the building structure in dotted lines.

Fig. 2 is a cross-sectional view of Fig. 1 taken on the line 2—2 thereof showing the platform and top pulley integration of the track unit.

Fig. 3 is a plan view of the bottom portion of the device seen in Fig. 1.

Fig. 4 is a cross-sectional view of the bottom portion of the device showing the power unit, track, and platform taken on the line 4—4 of Fig. 3.

Fig. 5 is an enlarged cross-sectional view of Fig. 2 taken on the line 5—5 thereof.

Fig. 6 is a partial cross-sectional view similar to Fig. 2 showing a modified track and carriage construction; and

Fig. 7 is a view similar to Fig. 4 showing a modified embodiment of the device.

Referring now to the drawings wherein like numerals refer to like and corresponding parts throughout the several views, the hoist power unit and track combination shown therein to illustrate the invention comprises a track assembly **10** adapted to incline and lie against the building **11** which is equipped with a traveling carriage **12** which is adapted to be elevated by an endless belt or chain **13** and a power unit **14** rockably hung to the cross member or rung **15** of the track assembly **10** and upon which is mounted the motor **16** which is connected to the track assembly via the normally loose drive belt **17** which is tightenable by the operator pressing on the power frame extension **18** in the direction of the arrow **19** so as to move the motor **16** outwardly as indicated by the dotted lines to tighten the drive belt **17** and thereby impart drive to the endless belt **13** to elevate the carriage **12**.

More particularly, the track assembly comprises two parallel side members **20** and **21** which may be the side pieces of a ladder and cross members **15** interconnecting the side members **20** and **21** which may be the rungs of a ladder as a ladder may be employed to constitute the structural component of the track member or a special track unit built for the purpose. Connected to the rails **20** and **21** are the roller guide channels **24** and **25** respectively which guide the rollers **26** and **27** respectively in their longitudinal movement.

The rollers **26** and **27** are disposed in pairs on either side and are connected to the carriage supports **28** and **29** which are interconnected by the strut **23**. It is to be noted that the parallel socket portions **30** and **31** are hollow for receiving the pins **32** and **33** which in turn support the platform base **34** so that the base **34** is mountable and demountable by inserting and extracting the pins **32** and **33** from their socket-like position in the members **30** and **31**.

A shaft **35** is rotatably disposed between the rails **20** and **21** at the top thereof and carries the pulley or sprocket **36** and a similar shaft **37** is disposed at the bottom of the rails **20** and **21** and carries the pulley or sprocket **38** fixed thereto and the drive pulley **39** fixed thereto as more fully described hereinafter.

The link belt **13** is disposed around the sprockets **36** and **38** and is connected to the carriage as at **40**, Fig. 2, so that when the belt is driven to move upwardly as seen in Fig. 1, the endless belt **13** will cause the carriage **12** to rise from the position seen in solid lines to the position seen in dotted lines, and, upon the drive being relaxed, the platform under gravity force will slide downwardly of the track assembly **10** and carry the belt **13** therewith until the stops **41** at the bottom of the track assembly limit the downward movement of the carriage **12**; the stops **42**, Fig. 5, adjacent the top of the track assembly **10** are adapted to limit the upward travel of the carriage **12**.

The power unit **14** comprises the reversely built frame

member having paired spaced rearwardly extending portions 50 and 51, Figs. 1 and 4, paired downwardly extending portions 52 and 53 and paired forwardly extending portions 54 and 55 and a front cross-connecting member 56 interconnecting the paired forwardly extending portions 54 and 55 and constituting a foot operation cross bar at the front of the device. The paired struts 58 and 59 interconnect between the paired members 50, 54, 51, and 55 respectively so that any tendency of the frame to spring or deform in use is prevented due to the truss aspect of the struts 58 and 59. The platform 60 is mounted between the frame members 54 and 55 and supports the motor 61 thereon which in turn supports and drives the motor pulley 16, the belt 17, and the drive pulley 39 on the shaft 37. Obviously a gear box, not shown, can be used in conjunction with the motor.

Referring to Fig. 7, it will be noted that a modified construction of the power unit 76 is illustrated wherein the frame member greatly simplified comprises paired hanging bars 70 which support the paired base members 71 which in turn support the motor 72 and it is to be noted that the modified power unit is moved to the right or outwardly by the lever 73 contacting the hanging bar 70 with the roller 74 so as to move the motor 72 outwardly to tighten the belt 17 so that drive is effected between the pulley motor 16 and the drive pulley 39.

The power units 14 and 76 are so hung on the cross member or rung 15 by the hangers 73 that they are capable of swinging or pendulating relative to the track assembly 10 to effect tightening or loosening of the drive belt 17 between the pulleys and it is to be noted that the balance of the drive units 14 and 76 is so integrated that the tendency of the unit is to swing to the left as seen in the drawings or toward the base of the track unit 10 to effect normal loosening of the belt 17 so as to normally establish a non-driving relationship between the motor and the track assembly. A stop is provided as by the struts 58 and 59 contacting the bottom rung or cross member 15A so as to prevent the device from swinging too far into the track area of the assembly and it is to be noted that the stop 77, Fig. 7, abuts the bottom of the track assembly 10 to prevent the power unit 76 from swinging too far to the left as seen in the drawings so as to maintain the belt 17 in fixed relationship relative to the pulley 16.

The balance of the power units 14 and 76 preferably is such that they swing into the track assembly to maintain the belt 17 in its normal loose and non-driving relationship but such tendency to swing can be effected by a spring 75 if desired.

The modification of the track construction shown in Fig. 6 comprises paired I beam rails 80 and 81 and a substantially U-shaped area cross member 83 and arms 84 and 85 which carry the paired rollers 86 and 87 respectively in engagement with the I beam flanges.

In operation the user sets the track element 10 against the building 11 and hooks the motor unit 14 on the track element 10 by disposing the hooks 72 over the rungs or cross members 15 so that the motor unit then swings into place against the bottom of the track unit 10 and the user then connects the belt 17 around the motor pulley 16 and around the drive pulley 39 and starts the motor 16. He then places the platform pins 33 in the tubular socket members 30 and 31 thereby positioning the platform 34 in operable position. He then loads the bundles, bricks or other materials desired to be elevated at the platform 34 and steps on the cross bar 56 in the direction of the arrow 19 which swings the motor 61 outwardly carrying the pulley 16 outwardly to tighten the belt 17 so that the motor 61 imparts rotation drive to the drive pulley 39 and this drive is transferred to the link belt chain or belt 13, which being attached to the carriage 12, raises the carriage from the position seen in solid lines of Fig. 1 to the position seen in dotted lines of Fig. 1 whereupon the top of the platform 34 extends over the top of the track unit 10 whereby the bundles slide off the platform 34 and dispose themselves on the roof of the structure 11. The user then lightens the foot pressure on the bar 56 allowing the carriage 12 to come down the track unit 10 at a controlled rate of speed as by regulating the slippage of the belt 17 relative to the pulleys 16 and 39 thereby controlling the descent of the carriage 12 and this is particularly important when the loading occurs at the top of the device when building materials and other items are being taken down from a building structure it is obvious that the device can lower same without allowing them to fall or travel by gravity.

The operation of the device as seen in Fig. 7 is the same as that of Fig. 1 and the remaining figures with the exception that the operator pulls on the lever 73 which thrusts the rollers 74 against the hanging bars or arms 70 to move the frame element 16 outwardly to tighten the belt 17 relative to the pulleys 16 and 39 so as to impart drive to the track element 10 to elevate the carriage 12 as desired.

The U-shaped bent frame members of the motor unit 14 provide all-around protection to the motor and associated parts when the motor unit 14 is being transported and the paired outwardly extending members 50 and 51 provide good hand grips for lifting the motor unit into a truck or to hook over the hooks 73 over the rungs or cross members 15; the bottom members 54 and 55 provide skid elements such as for pushing the motor assembly when demounted into a truck or vehicle for transportation.

With the platform 34 and the motor unit 14 removed from the track element 10, the track element 10 is easily placed by hand on top of a vehicle or in a truck and the platform 34 and motor unit 14 are easily transported and placed in a vehicle.

While the elements shown are made of structural metal such as aluminum or magnesium, it is also within the purview of the invention to make the track assembly side members and cross members of wood or any other suitable material and while a link belt or chain 13 has been shown disposed between the sprocket pulleys 38 and 36, it is obvious that a V-belt drive can be used in this connection.

The V-belt drive including the belt 17 and pulleys 16 and 39 is particularly suitable to the operation of the device due to the fact that when the belt is loose, the V portion rides in pulleys without driving relationship whereas when the user swings the motor frame outwardly of the ladder, the V-belt 17 tightens and imparts drive thereby constituting a clutch as well as a driving element.

The inventive hoist with these features constitutes a compact, durable, and neat appearing mechanism easily operated, to set, and demount and which can very easily and rapidly be set up on a building structure and very rapidly knocked down and easily transported to the next location.

Although but a single embodiment of the invention has been shown and described in detail in conjunction with two modifications thereof, it is obvious that many changes may be made in the size, shape, detail, and arrangement of the various elements of the invention within the scope of the appended claims.

I claim:

1. A hoist device comprising spaced paired longitudinal side members such as the side pieces of a ladder adapted to endwise rest on a surface and to extend upwardly therefrom a desired extent and to incline and rest against a structure, cross members such as the rungs of a ladder interconnecting said side members at desired intervals, a carriage adapted to move lengthwise on said side members, an upper pulley shaft disposed between said side members adjacent their upper ends, an upper belt pulley disposed on said upper shaft, a lower pulley shaft disposed between said side pieces adjacent their lower ends, a lower pulley fixed on said lower shaft, an endless belt

disposed on said pulleys connected to said platform, said lower pulley being adapted to drive said belt to move said carriage; a drive pulley fixed on said lower shaft, a frame swingably hanging on one said cross member at the back of said side members adjacent said drive pulley, a motor mounted on said frame, said frame being pendulously biased to swing toward said side pieces such as by the weight of said motor, a stop on said frame adapted to abut said side members to locate said frame and motor relative to said drive pulley, a motor pulley on said motor, a drive belt disposed on said motor pulley and said drive pulley normally loosely non-drivingly slippably disposed thereon, an extension on said frame extending past said side member to the front thereof so that the user can move said extension to swing said frame to tighten said motor belt to driving condition to power said device to move said carriage upwardly on said side members.

2. In a device as set forth in claim 1, said frame being demountably mountable relative to said side members via said hanging means and placing and removing said motor belt on said motor pulley.

3. A hoist device comprising spaced paired longitudinal side members adapted to endwise rest on a surface and to extend upwardly therefrom a desired extent and to incline and rest against a structure, a carriage adapted to move lengthwise on said side members, an upper pulley shaft disposed between said side members adjacent their upper ends, an upper pulley disposed on said upper shaft, a lower pulley shaft disposed between said side pieces adjacent their lower ends, a lower pulley fixed on said lower shaft, an endless belt disposed on said pulleys

and connected to said carriage; said lower pulley being adapted to drive said belt to move said carriage; a drive pulley fixed on said lower shaft; a frame, means swingably hanging said frame on said side members adjacent said drive pulley, a motor mounted on said frame, said frame being pendulously biased to swing toward said side pieces such as by the weight of said motor, a motor pulley on said motor, a drive belt disposed on said motor pulley and said drive pulley normally loosely non-drivingly disposed thereon, and means for moving said frame to tighten said motor drive belt to driving condition to power said device to move said carriage upwardly on said side members.

4. In a device as set forth in claim 3, said frame being demountably mountable relative to said side members via said hanging means and placing and removing said motor belt on said motor pulley.

5. In a device as set forth in claim 3, said means comprising a projection on said frame extending to the front side of said device to facilitate operation from the front of the device.

References Cited in the file of this patent

UNITED STATES PATENTS

528,608	Richter	Nov. 6, 1894
1,041,020	Carstens	Oct. 15, 1912
1,485,817	Schroeder	Mar. 4, 1924
1,933,131	Wood	Oct. 31, 1933
2,702,095	Kelly	Feb. 15, 1955