Oct. 18, 1955 C. L. LUTTON 2,721,054

MATERIALS HOIST

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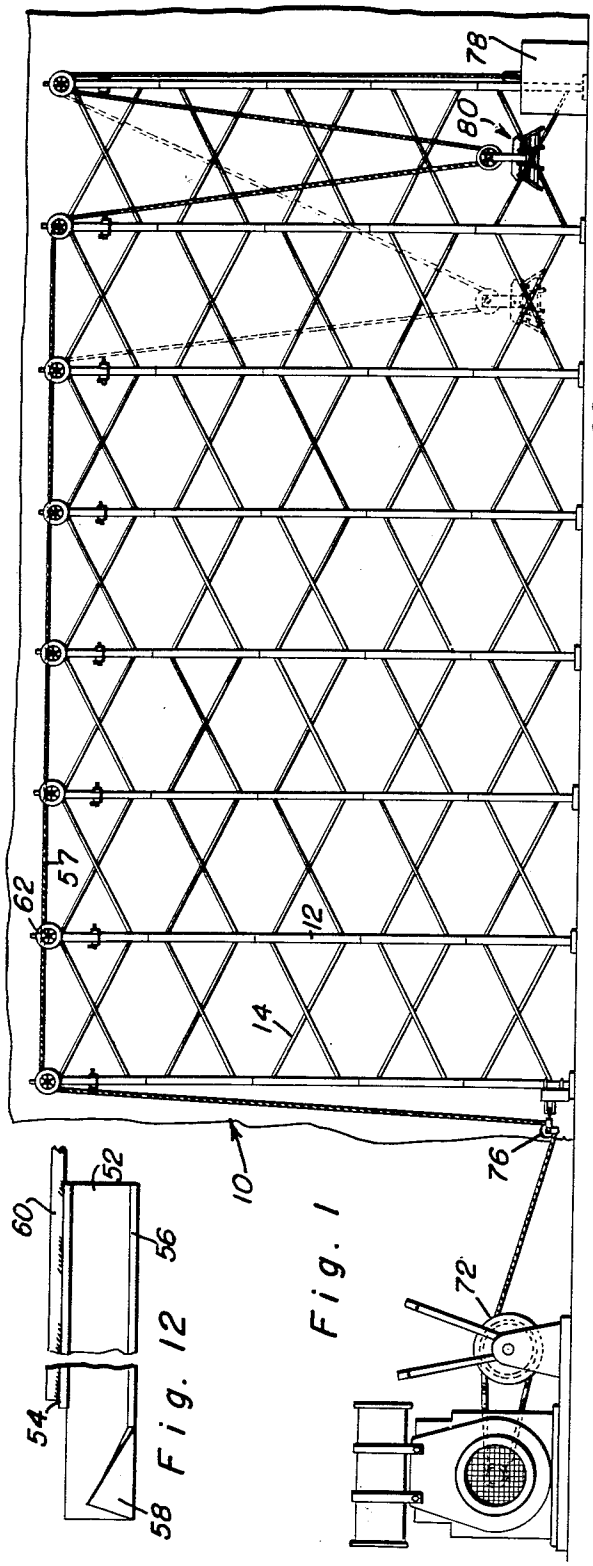

Fig. 1

Fig. 12

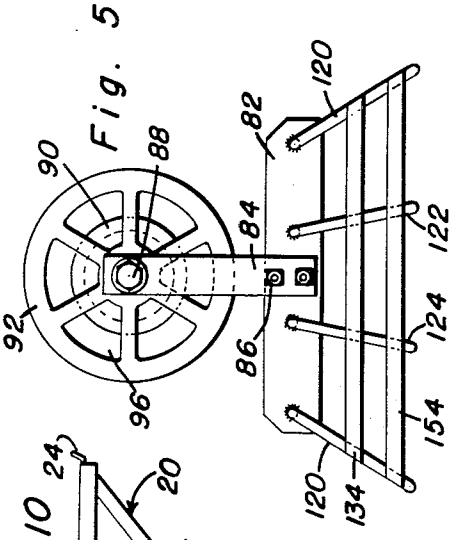

Fig. 5

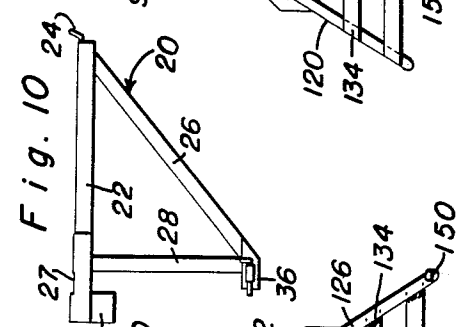

Fig. 10

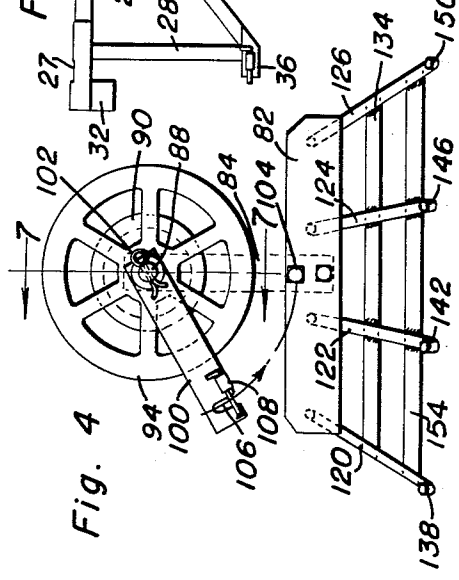

Fig. 4

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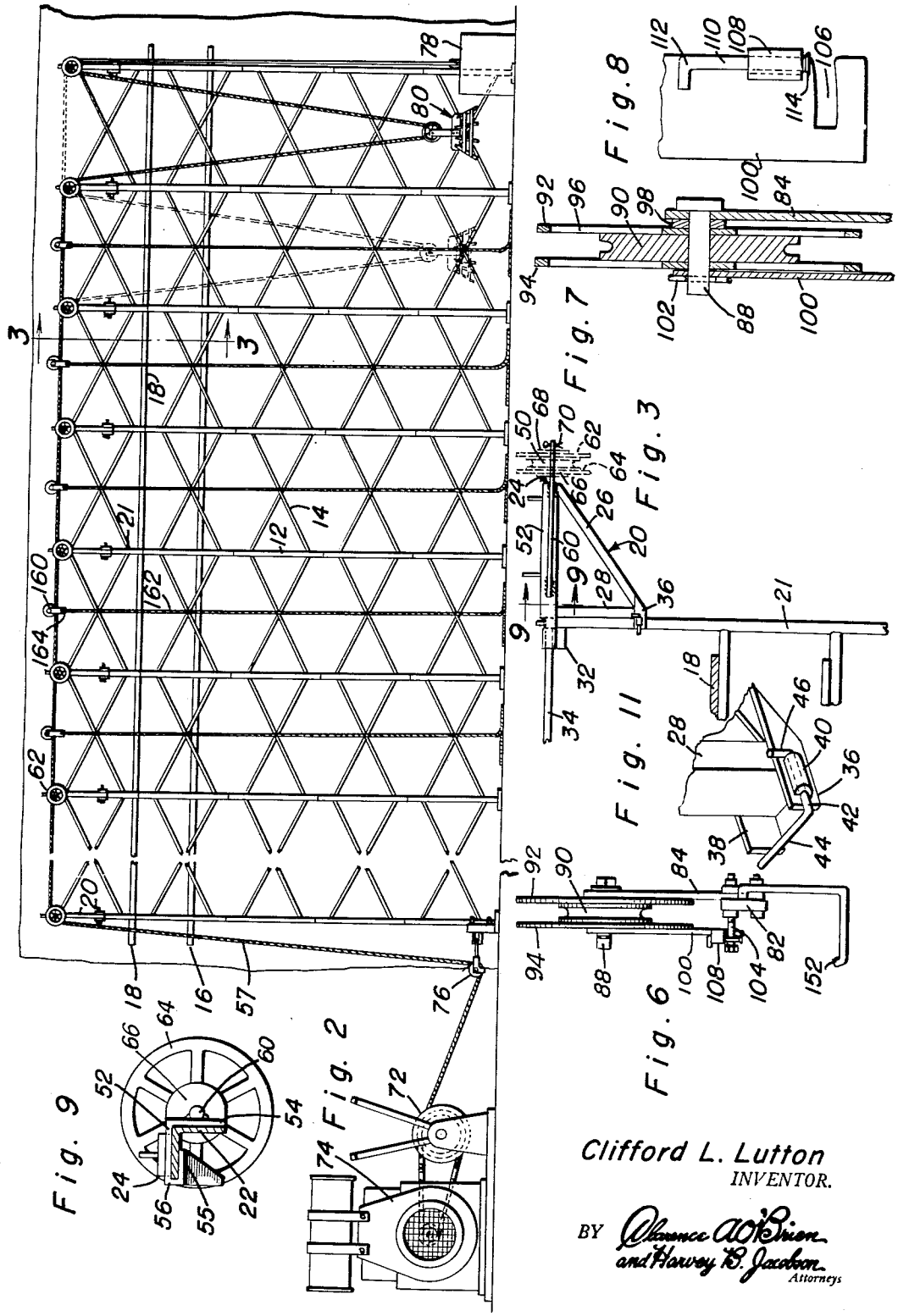

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United States Patent Office 2,721,054 Patented Oct. 18, 1955

2,721,054

MATERIALS HOIST

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Application February 3, 1953, Serial No. 334,908

2 Claims. (Cl. 254—194)

This invention relates to a materials hoist and particularly to a power driven hoist line mounted on a construction scaffold and adapted to lift materials to the workmen on the scaffold.

This application is a continuation-in-part of applicant's copending application Serial No. 253,719, filed October 25, 1951, now Patent No. 2,673,711.

In building operations it is customary to provide sectionalized scaffolding and to assemble the scaffolding as the wall or other structure progresses upwardly. The problem of supplying materials to the workmen on the scaffolding has always been of extreme importance and frequently requires very expensive apparatus to accomplish the lifting as well as an undue proportion of the labor involved.

The present invention is of a type in which a running line is applied over sheaves at the height or above the height at which the workmen are operating and utilizing a power winch on the ground to raise and lower portions of the line to deliver materials to workmen on the scaffold. In accordance with the present invention the sheaves are mounted adjacent the top portion of the scaffold by means of suitable sheave supporting brackets which have a double hook for fastening the bracket onto the upright of the scaffolding and simultaneously to a transverse portion of the scaffolding while the bracket itself is held against dislodgment by engagement with a perpendicular portion of the scaffold in spaced relation to the double hook. Various systems have heretofore been suggested for allowing the running line to be lowered at any portion along the scaffolding so that material may be delivered to any portion throughout the entire length of the scaffolding. Also, difficulty has been experienced in allowing the line to run free so that the grapple or other materials lifting device would be readily lowered when unloaded. The present invention eliminates most of the difficulty of this situation by utilizing sheaves for supporting the cable and substantially circular line guides mounted adjacent to the sheaves so that the line will not be readily removed from the sheaves and line guides being rotatable with or with respect to the sheaves so that any pressure applied thereto by the running line will cause rotation of the line guide and prevent its being lifted off of the sheaves. A grapple is likewise provided with a sheave which will be retained on the running line by any suitable locking device which may be readily uncoupled so that the grapple may be transferred along the running line to various portions of the scaffold as may be desired or so that one grapple may be readily detached from the running line and another grapple attached thereto at another portion along the line.

Difficulty has been experience in providing grapples which are suitable for lifting various types of building material without a change of grapple. This has been eliminated by utilizing a grapple having a plurality of diverging arms so spaced that various types of building blocks or other material may be mounted thereon without

undue interference and which may be readily lifted therefrom without substantial interference.

It is accordingly an object of the invention to provide an improved materials lift.

It is a further object of the invention to provide a materials lift in which materials may be delivered in any portion of a scaffold.

It is a further object of the invention to provide an improved sheave support for a materials lift.

It is a further object of the invention to provide an improved line mounting for a materials lift.

It is a further object of the invention to provide an improved grapple for lifting materials onto a scaffold.

Other objects and many of the attendant advantages of the present invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing, in which:

Figure 1 is a front elevation of a scaffold with the improved hoist in place;

Figure 2 is a similar view showing a riding pulley and retrieving line for securing any portion of the line for applying grapples thereon;

Figure 3 is an enlarged cross section through the scaffold and hoist taken substantially on the plane indicated by the line 3—3 of Figure 2;

Figure 4 is an enlarged front elevational view of the grapple;

Figure 5 is a similar rear elevation of the grapple;

Figure 6 is an end elevation of the grapple;

Figure 7 is an enlarged cross section through the grapple hanger taken substantially on the plane indicated by the line 7—7 of Figure 4;

Figure 8 is an enlarged elevation of the catch for the line retaining arm with the grapple mounting;

Figure 9 is an enlarged cross section through the sheave mounting taken substantially on the plane indicated by they line 9—9 of Figure 3;

Figure 10 is an elevational view of a sheave mounting bracket;

Figure 11 is a perspective view of a bracket lock; and

Figure 12 is a bottom plan view of the sheave mounting saddle.

In the exemplary embodiment of the invention the scaffold **10** is comprised of a plurality of sections **12** stacked one upon another as is well known in the art and held in rigidly spaced relation by means of cross braces **14** which are also well known and utilized in the art.

A platform **16** is usually provided at a suitable height on the scaffolding for the workmen to stand on and a second platform **18** is provided for the reception of materials such as brick, block, mortar and the like, to be utilized by the workmen standing on the platform **16** or by any other platform positioned in the scaffold **10**.

In order to lift material onto the scaffolding a sheave bracket **20** is mounted on each of the vertical uprights **21** preferably on the topmost stack of sections **12**.

The sheave supporting bracket **20** comprises a top member **22** of angle construction as shown in Figure 9 and is provided with a hook or stop member **24** usually constructed by turning up a portion of the top flange of a member **22**. A brace member **26** is connected to the top member **22** adjacent the end adjacent to the hook **24** and extends in divergent relation thereto. A strut **28** is mounted between the inner end of the brace **26** and the top member **22** adjacent the inner end thereof. The strut **28** being rigidly connected by any suitable means such as bolted, welded or the like. A slot **27** is cut in the top flange of the member **22** adjacent to the strut **28** to provide a horizontal slot therein for engagement with the upright member **21**. Likewise a depending angle member is secured to the top flange of the member **22** and depends downwardly in spaced relation to the side flange of the

member 22 to provide a hook 32 which will engage a transverse horizontal member 34 so that the bracket 20 will be held against vertical displacement or accidental displacement from the standard 21. The bottom end of the brace 26 and the strut 28 are secured to the standard 21 by means of a pair of projections 36 and 38 which are adapted to extend outwardly beyond the strut 28 so that they embrace the standard 22. In order to lock the projections 38 and 36 onto the standard 22 a locking member comprises a bearing bracket 40 mounted rigidly on one of the projections such as 36 and having a rod member 42 journaled therein. One end 44 is bent in angulated relation to the rod 42 so that it extends across the opening including the ends of the projections 36 and 38 and a second angulated end 46 is provided at the opposite end of a bearing 40 so that the rod 42 is locked in the bearing 40 and the projection 46 is at right angles to the projection 44 and so arranged that when the projection 44 is closing the ends of the projections 36 and 38, see Fig. 11, the end 46 will be in engagement with the side of the projection 36 to prevent any further motion downwardly of the projecting angulated end 44. Likewise, when the angulated end 44 is rotated to an outwardly extending position the angulated end 46 will again contact the side of the projection 36 to prevent further rotation of the rod 42 so that the locking member or angulated end 42 will either be in or out of locking engagement and will be retained in such position.

In order to mount a sheave 50 on the bracket 20 a saddle member 52 of channel formation is adapted to mount on the top member 22 with one flange 54 of the saddle member 52 in engagement with one of the side flanges of the top member 22. The flange 56 depends over the edge of the top flange of the angle member 22 and has an inwardly extending corner 58 made by bending the corner of the flange 56 inwardly to provide an inset portion which engages with the underside of the top flange of the member 22. An axle 60 is rigidly mounted on the side of the saddle 52 by any suitable method such as welding and extends longitudinally beyond the end thereof so that the sheave 50 may be journaled thereon. Substantially disk line guides 62 and 64 are journaled on the axle 60 in immediate proximity to the sheave 50 and extend radially outward from the sheave 50 so as to provide a deep groove in which a materials hoist line 57 may be received. The entire sheave assembly will be retained on the axle 60 by any suitable means such as washers 66 and 68 and a suitable fastener such as a cotter pin 70. The running or hoist line 57 will be connected to a drum 72 driven by any suitable means such as a motor 74 and run through an anchor pulley 76 adjacent the base of the scaffold and extending upwardly to the first of the sheaves 50 throughout the length of the scaffolding 10. Preferably the free end of the line 57 extends downwardly and connects to a weight 78 which is heavier than any load expected to be lifted to the platform so that in the event the motor 74 overruns the weight 78 may be lifted without causing undue strain to the scaffold.

In order to lift the materials from the ground to the platform a grapple 80 is provided for engagement with the running line 57 for elevating material by pressing a portion of the running line or hoist line 57 between adjacent sheaves 50 so that the grapple may be raised or lowered by means of tightening the line 57 by means of drum 72.

The grapple 80 comprises a base plate 82 on which is rigidly secured an upstanding standard 84 by any suitable fastener such as the bolts 86. A pivot pin 88 is rigidly mounted adjacent the top portion of thee standard 84 and a sheave 90 is journaled on the pin 88 and provided with line shields or guides 92 and 94 preferably of disk formation and having apertures 96 the use of which will presently be described. The sheave 90 and the line guides 92 and 94 are mounted on the pin 88 and preferably are provided with antifriction washers 98. A locking arm 100 is pivotally mounted on the pin 88 and retained thereon by any suitable fastener such as the cotter pin 102. The base 82 is provided with a locking pin 104 which may conveniently be an extension of the bolts 86 which lock the standard 84 onto the base 82. Locking arm 100 is provided with a transverse slot 106 adapted to engage the locking pin 104 so that when the slot 106 is in engagement with the pin 104 the sheave 90 and its assembly will be rigidly connected with respect to the base 82 so that a load will not apply a bending stress on the standard 84.

In order to retain the arm 100 in engagement with the pin 104 a bearing sleeve 108 is mounted on the edge of the arm 100 adjacent to the slot 106 and has received therein a locking pin 110 having a stop 112 to retain the pin from dropping through the bearing 108 while the lower end of the pin is upset as at 114 to prevent its withdrawing upward through the bearing sleeve 108.

A plurality of depending arms 120 to 126 are arranged in outwardly flaring depending relation on the plate 82 and arranged preferably in a plane formation. Arms 120 to 126 are rigidified by means of a cross brace 134 applied to the arms 120 to 126 by any suitable means such as welding. Arms 120, 122, 124 and 126 terminate in lift fingers or hooks 138, 142, 146 and 150, respectively, which extend laterally from said arms. Fingers 138, 142, 146 and 150 terminate in substantially a straight line at the bottom of the grapple. The fingers 138, 142, 146 and 150 extend outwardly far enough to receive building blocks, buckets or other items to be lifted to the platform, and are preferably provided with upturned tips 152 to retain said building blocks or other materials thereon. Preferably the fingers are so spaced that building blocks or other such materials may be hung on each of the fingers without materially interfering with any such material hung on the other fingers. Preferably a reinforcing member 154 is provided on the arms extending outwardly to the fingers so that all portions of the grapple are rigidly secured and braced with respect to each other.

In the operation of the device a single grapple 80 may be provided for the entire scaffold and may be readily transferred from bent to bent of the scaffolding by lowering the grapple 80 to the ground and taking up the slack in the running line 57 so that it may be released from one of the sheaves 50 after which the running line can be reassembled with the bight in the next bent as shown in Figure 1. However, this method of transferring the grapple requires the assistance of a person on the scaffold and is inconvenient when transferring over a space of several bents.

Therefore, it is preferred to provide a plurality of grapples which are distributed at the base of the scaffold, although obviously a single grapple can be used, and the grapples applied where needed. For accomplishing the application or removal of grapples to the running line 57, a light riding pulley 160 is detachably secured on the line 57 in each bent of the scaffold, and a light retrieving line 162, of sufficient length to be reached from the ground, is attached to the pulley 160. The pulley 160 is preferably provided with a balance weight 164 to retain the pulley 160 in upright position and prevent twining of the retrieving line 162 about the running line 57.

In the operation of the preferred arrangement, the grapples are changed by the workman grasping the line 162 and releasing the drum 72 so that line 57 may be readily drawn down after which a grapple may be applied by applying the sheave 90 on the line 57 and swinging the arm 100 into engagement with pin 104 and dropping the lock pin 110 into place. The riding pulley 160 being removed from the line 57, after which the drum 72 will be operated to remove any slack from line 57 and the grapple is ready for operation. The grapples may be removed by unlatching the arm 100 and removing sheave 90 from the line 57 after which a riding pulley 160 will be attached.

The grapple **80** may be loaded with any desired type of material and lifted to the platform by operating motor **74** to drive drum **72** in the desired direction. Obviously the grapple may operate between ground and any desired point on the scaffold, or between points on the scaffold.

It will be seen that for purposes of exemplification a preferred embodiment of the invention has been shown and described according to the best present understanding thereof, it will be apparent that changes and modifications may be made in the construction and arrangement of the parts thereof without departing from the true spirit and purpose of the invention.

What is claimed as new is as follows:

1. In a materials hoist having a hoist line, a grapple comprising a base member, an upstanding standing secured on said base, an axle pin mounted adjacent one end of said standard, a sheave journaled on said axle pin, a disk like line guide journaled on said axle pin at each side of said sheave, a locking stud secured on said base, a locking arm pivotally mounted on said axle pin, means for maintaining said locking arm in engagement with said stud, a plurality of laterally extending pick up fingers suspended from said base.

2. In a materials hoist having a hoist line, a grapple comprising a base member, an upstanding standard secured on said base, an axle pin mounted adjacent one end of said standard, a sheave journaled on said axle pin, a disk like line guide journaled on said axle pin at each side of said sheave, a locking stud secured on said base, a locking arm pivotally mounted on said axle pin, a transverse slot in said locking arm engageable with said stud, a latch pin engageable with said slot, pick up fingers suspended from said base.

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