(No Model.)

H. R. PALMER.

HOISTING AND CONVEYING APPARATUS.

No. 602,168. Patented Apr. 12, 1898.

Fig. 1.

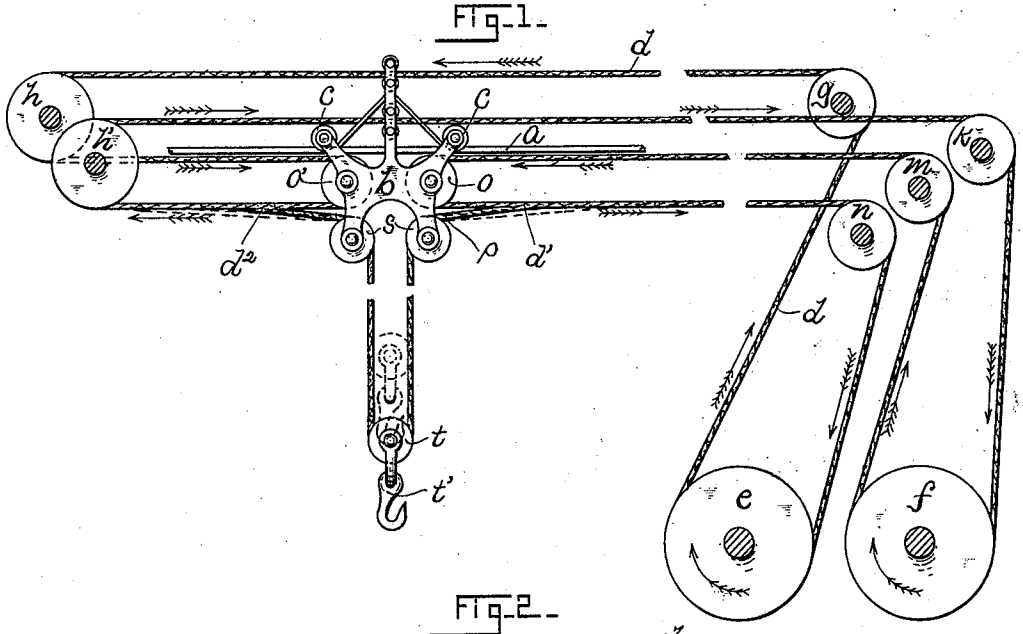
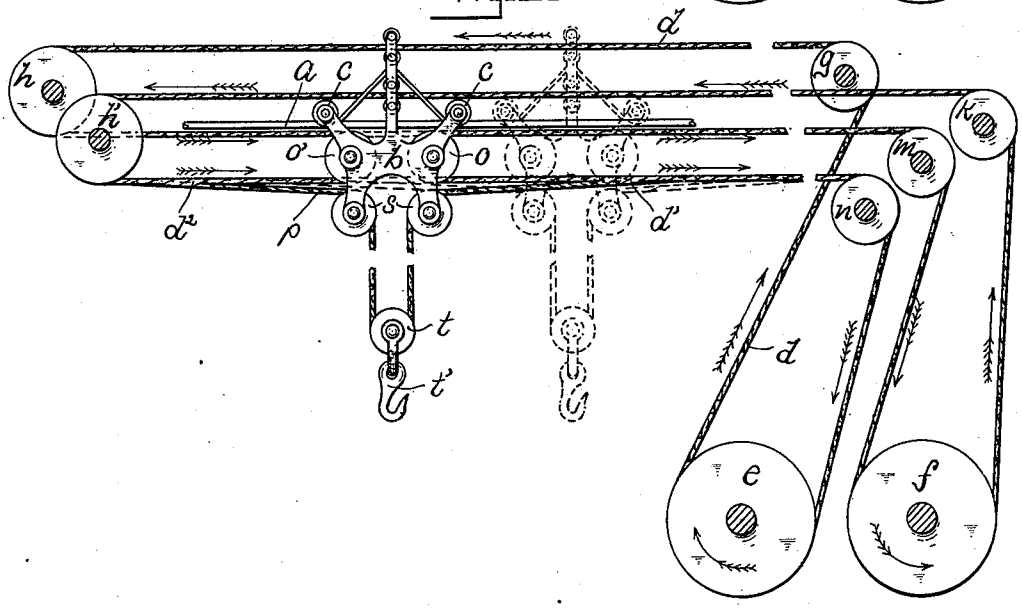


Fig. 2.



WITNESSES

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HOISTING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 602,168, dated April 12, 1898.

Application filed December 15, 1897. Serial No. 661,942. (No model.)

To all whom it may concern:

Be it known that I, HERBERT R. PALMER, a citizen of the United States, residing in Cleveland, Cuyahoga county, State of Ohio, have invented certain new and useful Improvements in Hoisting and Conveying Apparatus, which improvements are fully set forth and described in the following specification, reference being had to the accompanying sheet of drawings.

My device is in that class of apparatus commonly used in the transportation of heavy loads, as in the loading or unloading of coal, in quarrying, in building of dams or other works of construction, or, in fact, for any purpose in which heavy loads have to be first raised, then transported, and finally deposited in a desired location.

The object of this invention is to improve this class of apparatus by so simplifying the same that it may perform the work to be accomplished with much less mechanism than is ordinarily necessary in such apparatus as now commonly used.

The essential features of apparatus of the class to which my invention relates consist of a cable or track stretched between given points, upon which track is mounted a carriage adapted to travel reciprocally thereon. Said carriage usually has small cables or ropes (known as "driving-cables") attached thereto, by means of which it (the carriage) is made to travel in either direction upon its main or supporting cable or track, the load being suspended from said carriage by suitable mechanism known as the "fall-ropes." These fall-ropes are adapted to be moved to raise or lower the load. It will now be understood that by means of apparatus of the class described the load may be readily raised, transported, and lowered into a desired location.

The construction of my newly-invented apparatus is such that by a novel arrangement of a single continuous driving-cable the carriage is caused to travel reciprocally upon the main or supporting cable, or, when desired, the load carried by the carriage is caused by said cable to be either raised or lowered, such operations of driving the carriage and raising and lowering its load by means of the single cable being accomplished solely by proper manipulation of the driving mechanism of said cable, as will be hereinafter fully described. The said driving-cable of my device is at all times taut, or sufficiently taut to render unnecessary the usual mechanism for taking up the slack. Also, as above stated, no special mechanism is necessary to accomplish the raising and lowering of the load, and all this is accomplished without the aid of the usual counterpoise or weights.

In the accompanying drawings, Figure 1 shows in elevation my newly-invented apparatus and explains the manner in which the same operates to effect the raising or lowering of the load. Fig. 2 is a similar view, but explains the manner in which the conveying of the load is effected.

Referring to the drawings, the letter *a* denotes the main cable or track, which, it is assumed, is stretched over the point or points where work is to be performed and which serves to support the reciprocally-traveling carriage, (denoted as a whole by letter *b*.) Carriage *b* depends from the track *a* and is provided with grooved tandem wheels *c*, mounted therein and adapted to travel on said track, and from said carriage the load to be conveyed is suspended.

The carriage *b* is caused to travel reciprocally upon track *a* by means of an endless cable or rope *d*, which engages the same in a manner hereinafter described. Cable *d* is provided with two distinct driving mechanisms by the proper manipulation of which the carriage *b* is caused to travel in either direction desired upon the track *a*, or said carriage is allowed to remain stationary upon track *a* while the raising or lowering of the load carried thereby is effected. The said driving mechanism of the cable *d* consists of two large drums *e* and *f*, either of the grooved or winch type, which drums the cable *d* encircles frictionally a sufficient number of turns to insure the driving of the cable when the drums are set in revolution.

Drums *e* and *f* may each be provided with independent power or may be driven by a common power, and said drums may be located side by side on a common shaft or on independent shafts, as shown in the drawings; but whatever the means employed for driving said drums or the manner in which

they are located relatively to each other such driving mechanism must be such that the drums may be caused to rotate in unison in the same direction or in opposite directions.

Near each end of track *a* a number of idle score-pulleys are located, which latter are adapted to receive and support the cable *d* in operative relation to the carriage *b*, and over said pulleys the cable *d* is guided when my apparatus is in operation.

Of the score-pulleys just mentioned those near one end of track *a* (the right-hand end, as shown in the drawings) are four in number, all of which, it is assumed, are properly supported relatively and adjacent to each other, and are denoted by reference-letters *g*, *k*, *m*, and *n*, respectively. Near the opposite end of the track *a* two of said score-pulleys are similarly supported, and are denoted by reference-letters *h* and *h'*, respectively.

Carriage *b* has journaled therein near its opposite ends two pulleys *o o'*, similar to the score-pulleys just mentioned, but preferably of somewhat smaller diameter.

Referring now to the manner in which the driving drums and pulleys above mentioned are engaged by cable *d*, it will be seen (taking the drum *e* as a starting-point, Fig. 1) that cable *d*, leading from said drum, engages in turn the pulley *g*, pulley *h* at the opposite end of track *a*, pulley *o'* in carriage *b*, pulley *h'*, adjacent to pulley *h*, and crossing again to the opposite end of track *a* it engages the pulley *k*, drum *f*, pulley *m*, pulley *o* in carriage *b*, pulley *n*, and thence back to drum *e*.

Reference-letter *p* denotes a section of cable whose opposite ends are spliced or otherwise secured to cable *d*, one at the point *d'*, midway pulley *n* and the pulley *o* of carriage *b*, and at the point d^2, midway pulley *h'* and pulley *o'* of carriage *b*. In the lower portion of said carriage two pulleys *s* are journaled, over which the cable *p* renders and between which said cable depends in loop form, in the lower portion of which loop a pulley-block *t* is located, having a hook *t'*, to which the load to be moved is secured.

Referring again to Fig. 1 of the drawings and assuming that it is desired to operate my apparatus to simply raise the load, the drums *e* and *f* are set in revolution in the same direction as denoted by the arrows, resulting in driving cable *d*, as shown by the arrows, causing the cable to render idly over the various pulleys which support it. As the above action of the drums *e* and *f* causes the cable *d* to simply render upon its supporting-pulleys, the position of carriage *b* will of course be unaffected; but it will be seen by reference to the arrows that the portion of cable *d* leading from pulley *o* to pulley *n* and the portion leading from pulley *o'* to pulley *h'* are caused to travel in opposite directions, thus drawing apart points *d' d²* of cable *d* and causing cable *p* to render over its pulleys *s*, with the result of drawing upward the loop portion of said cable and raising the pulley-block *t* and the load secured thereto. (See dotted lines of said figure.) To lower the load carried by my apparatus, it is obvious that by reversing the directions of rotation of drums *e* and *f* the cable *d* will be also reversed, causing points *d d'* therein to approach each other, and thus the loop in cable *p* will be lengthened and the block *t*, supported thereby, with its load, will be lowered.

Referring now to Fig. 2 of the drawings and assuming that it is desired to operate my apparatus to convey a load from place to place, the drums *e* and *f* are caused to revolve in opposite directions, as shown by the arrows. Starting from pulley *o* that portion of belt *d* leading therefrom over pulley *n* to the drum *e* will be caused to travel in the same direction as that portion of said cable parallel thereto leading from said pulley *o* to pulley *m* and the drum *f*. It will therefore be seen that said two portions of cable *d*, engaging pulley *o*, will draw against each other. The cable cannot render over said pulley. Therefore as the rotation of the drums is continued that portion of the cable *d* doubled upon itself to encircle the pulley *o* will be continually shortened, with the result of drawing to the right the carriage *b*, the latter traveling upon the track *a*. (See dotted lines, Fig. 2.)

It will be readily understood from the drawings that when carriage *b* travels on track *a*, as just described, the doubled portion of the cable *d*, engaging pulley *o'*, will lengthen proportionately as the doubled portion of said cable engaging pulley *o* is shortened by reason of the travel of the carriage.

To reverse the travel of carriage *b*, it is simply necessary to reverse the direction of rotation of drums *e* and *f* from that shown in Fig. 2.

When my apparatus is being utilized to cause carriage *b* to traverse its track, the points *d' d²* remain in a given position relatively to each other, and thus the load remains at a given elevation.

My described hoisting and conveying apparatus has the desirable qualities of simplicity, cheapness of construction, and ease of manipulation.

Having thus described my invention, I claim—

1. In hoisting and conveying apparatus, in combination, a track or way, a carriage mounted to travel on said way, and an endless cable driven and controlled by two independently-operated drums; said cable being supported, and connected with the said carriage, substantially as specified.

2. In hoisting and conveying apparatus, in combination, a track or way, a carriage mounted to travel on said way, an endless cable controlled by two independently-operated driving-drums and connected with the said carriage as set forth, and a hoisting-cable *p* rove through pulleys in the said car-

riage and secured to the driving-cable at opposite sides of said carriage, substantially as described.

3. In hoisting and conveying apparatus, in combination, a fixed way, a carriage mounted to travel reciprocally on said way, and provided with pulleys *o o'*, pulleys *h h'* located at one end of said way, pulleys *g*, *k*, *m* and *n* located at the opposite end of said way, and an endless cable controlled by two independently-driven drums, said cable being passed around the said pulleys, substantially as set forth.

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