B. C. RIBLET.

CABLE CONVEYER HOIST.

APPLICATION FILED NOV. 23, 1904.

913,564.

Patented Feb. 23, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

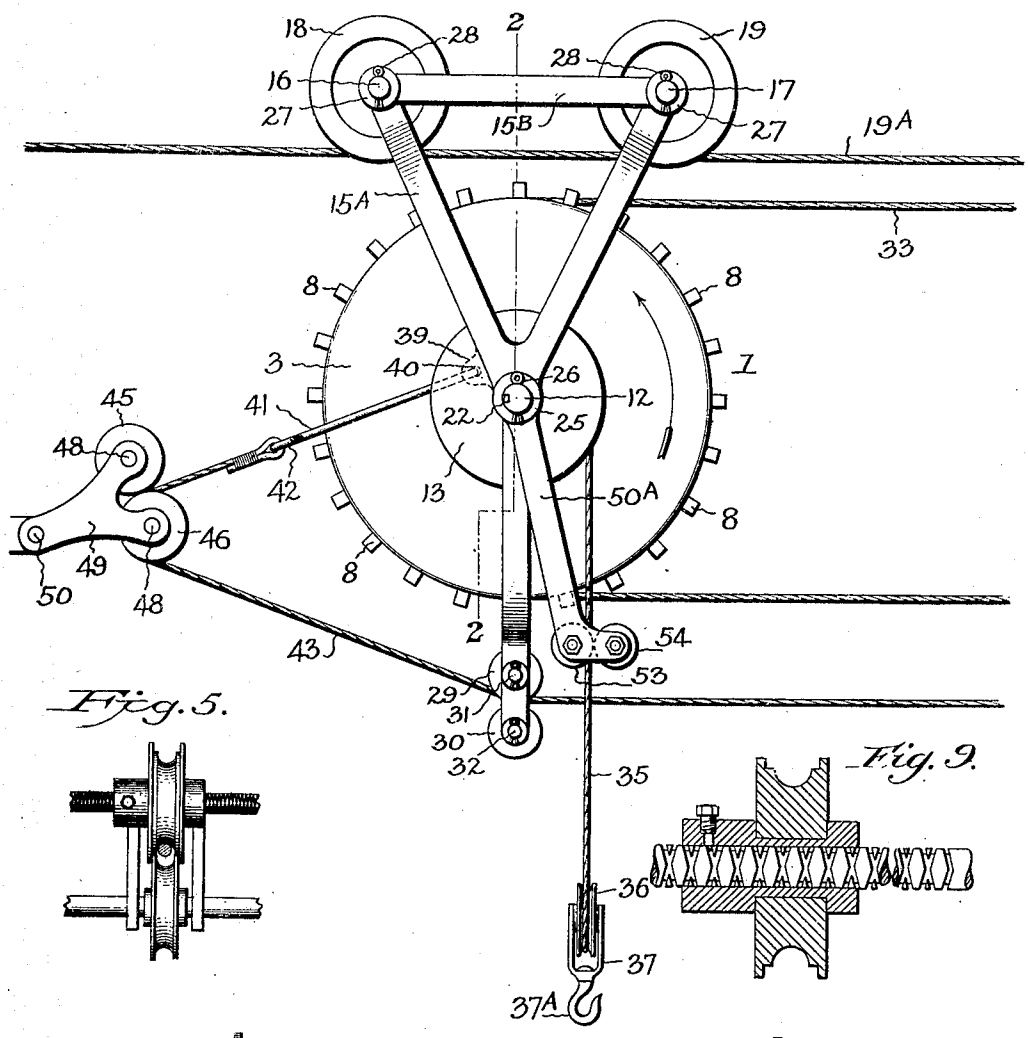


Fig. 5.

Fig. 3.

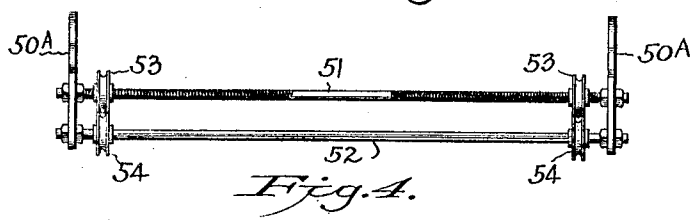


Fig. 4.

Witnesses:
G. Sargent Elliott.
Bessie Thompson

Inventor:
By Byron C. Riblet.
H. P. Bailey. Attorney

B. C. RIBLET.

CABLE CONVEYER HOIST.

APPLICATION FILED NOV. 23, 1904.

913,564. Patented Feb. 23, 1909.

3 SHEETS—SHEET 2.

Fig. 3.

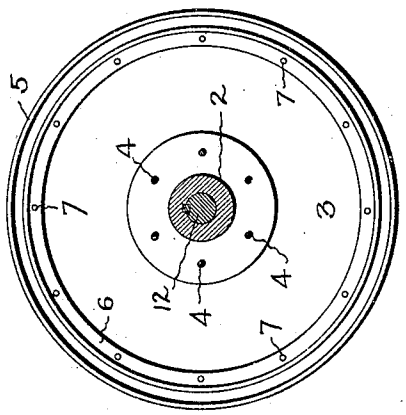


Fig. 6.

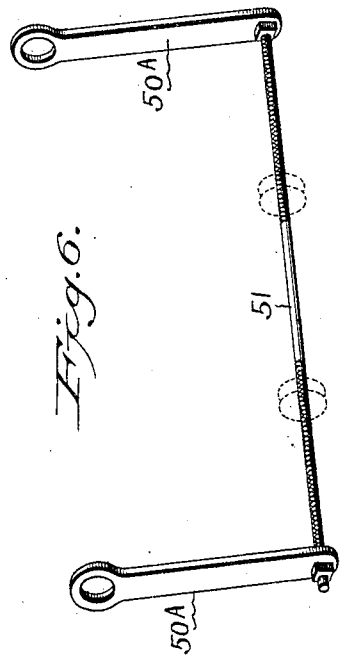
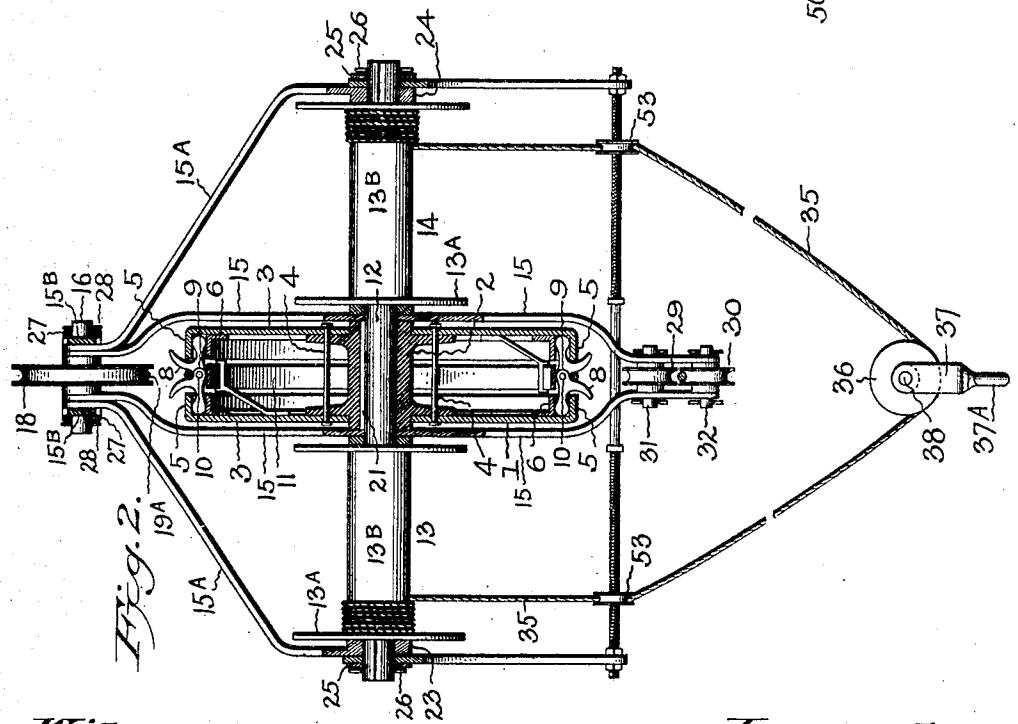


Fig. 2.



Witnesses:

G. Sargent Elliott.

Bessie Thompson

Inventor:

Byron C. Riblet.

By H. S. Bailey. Attorney.

B. C. RIBLET.

CABLE CONVEYER HOIST.

APPLICATION FILED NOV. 23, 1904.

913,564.

Patented Feb. 23, 1909.

3 SHEETS—SHEET 3.

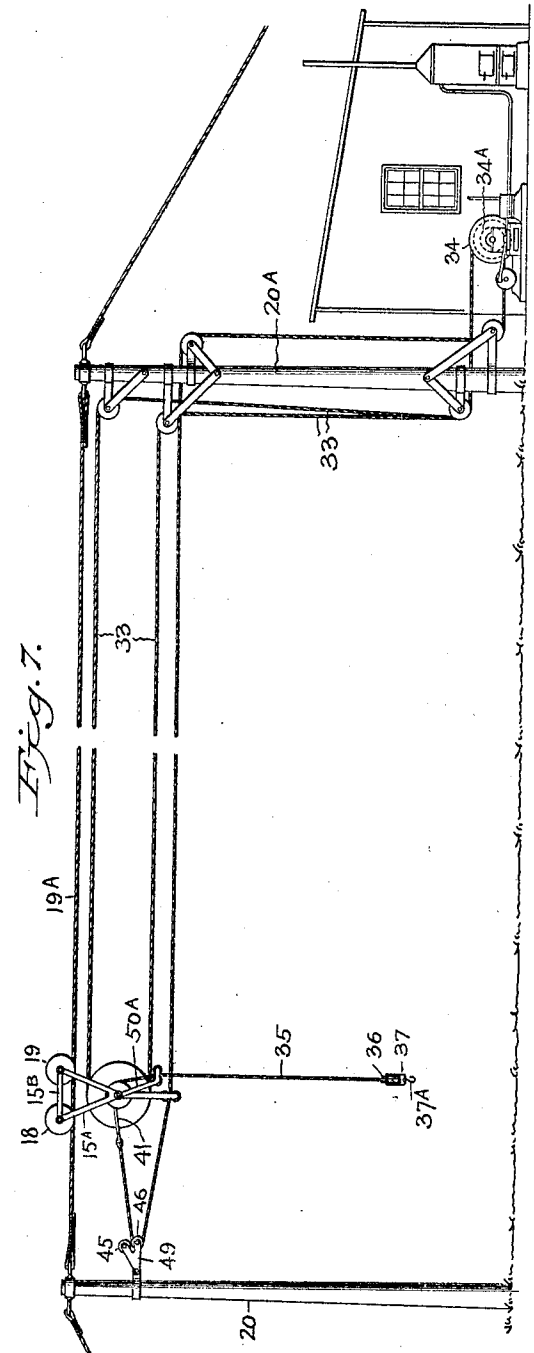


Fig. 7.

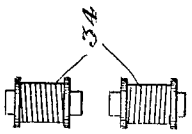


Fig. 8

Witnesses:
G. Sargent Elliott.
Bessie Thompson

Inventor:
By Byron C. Riblet.
H. S. Bailey. Attorney.

UNITED STATES PATENT OFFICE.

BYRON C. RIBLET, OF SPOKANE, WASHINGTON, ASSIGNOR TO THE A. LESCHEN & SONS ROPE COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

CABLE CONVEYER-HOIST.

No. 913,564. Specification of Letters Patent. Patented Feb. 23, 1909.

Application filed November 23, 1904. Serial No. 234,031.

To all whom it may concern:

Be it known that I, BYRON C. RIBLET, citizen of the United States of America, residing at Spokane, in the county of Spokane and State of Washington, have invented certain new and useful Improvements in Cable Conveyer-Hoists; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in cable conveyer hoists and the objects of my invention are: First, to provide a double drum direct-operated cable hoist. Second, to provide a simple, durable and easily manipulated cable conveyer hoist. I attain these objects by the mechanism illustrated by the accompanying drawings, in which:

Figure 1, is a side elevation of a cable hoist embodying my invention; the same being mounted upon a track rope. Fig. 2, is a vertical sectional view of the same, taken on the line 2—2 of Fig. 1; the drums being in full lines. Fig. 3, is a sectional view through the improved cable grip wheel. Fig. 4, is a plan view of my improved rope guide which insures the even winding of the hoist rope upon the drums. Fig. 5, is a modification of the same, in which one of the guide sheaves is provided with flanges, which over-lap the flanges of the other guide sheave. Fig. 6, illustrates still another modification of the rope guide in which a single guide sheave is employed for each drum; and, Fig. 7, is a side elevation, illustrating the manner of operating the improved cable hoist. Fig. 8 is a diagrammatic plan view of winding drums. Fig. 9 is a detail view, on a larger scale, of the reversely-threaded rod carrying the sheaves 53, 54.

Similar characters of reference refer to similar parts throughout the several views.

Referring to the drawings: The numeral 1, designates a wire rope cable sheave grip wheel. This grip wheel consists of the hub portion 2 and the sheet steel side flanges 3, which are secured to the hub portion 2 at their central portion by bolts 4, which pass loosely through both sides and bolt them together. The outer ends of the side flanges of the sheave are introverted towards each other, and form a marginal flat rim 5, and to the inside of each flange at a short distance from the terminal band, right angled rings 6 are secured to each flange. These right angled rings are preferably made of sheet iron or steel and the limbs of both rings are short, and one limb is placed against the side of the flanges and is riveted there by rivets 7. The other limb of these right angle rings forms an annular bearing surface immediately below the rim 5, and between these two rims or bearing surfaces I place the round heel end of a commonly used form of cable rope grip jaws 8, the jaw end portions of which are provided with lugs 9, which are pivoted together by a rivet 10. Enough of these cable grips are placed in the recesses of the flanges of the sheave grip wheel, to stand close together around its periphery.

A loose ended ring shaped flat band steel spring 11, which is made with outward expanding resilient pressure is placed under the center of the jaws of the grips and normally holds them open, while the pressure of a cable under a strain causes the grips to move radially inwardly and against the ring spring and close their jaws against the cable thereby gripping and holding fast to it. This grip sheave wheel is mounted on the central portion of a shaft 12, which extends far enough beyond it on each side to receive two cable winding drums 13 and 14, which I term load hoisting drums and through the four **Y** shaped pendants 15 and 15^A which are formed of two sets. The upper ends of both sets of these pendants are pivotally secured to shafts 16 and 17, upon which trolley sheaves 18 and 19 are rotatably mounted. These trolley sheaves are mounted on a track rope 19^A, that is supported at its opposite ends at the tops of suitable supporting towers 20 and 20^A, see Fig. 7, which are positioned at predetermined distances apart on opposite sides of the work where the cable hoist conveyer is to be used. Connecting rods 15^A are secured at their opposite ends to the ends of the trolley sheave shafts 16 and 17, on both sides of the trolley sheaves. The grip wheel is keyed to the main shaft by the key 21, and the drums are also keyed to the main shaft, with keys 22. These drums consist of the hubbed flanges 13^A and the sheet iron drums 13^B, which are secured to the flanges. The main shaft extends beyond the drums through

the ends of the pendants, in which it is journaled in suitable journal boxes or hubs 23 and 24, formed thereon or secured thereto. The main shaft extends beyond its journals and washers 25 are placed on the ends of it, and split pins 26 are placed through its ends. The ends of the shafts of the trolley wheels also extend through and beyond the pendants and connecting rods and washers 27 are placed over their ends and split pins 28 are placed through their ends, and thus secure them to the pendants. The pendants are made in two sets of two each, which stand directly over one another, and they are preferably connected together at their upper ends where they connect to the shafts 16 and 17. Both sets diverge outwardly from the shafts of the trolley sheaves, the inner set 15 to a point just above and beyond the top of the grip wheel 1, where they are bent to depend vertically to just below the lower edge of the grip wheel, from which point they converge to the sides of two small cable sheaves 29 and 30, which are mounted on pins 31 and 32. The ends of these pins are journaled in hub boxes formed on the lower ends of the inner pendants 15. The outside pendants 15^{A} diverge outwardly from the trolley sheave shafts at a much greater outward angle and extend to just above the outer flanges of the cable drum from which point they depend vertically downward to the shaft. Their ends are provided with journal boxes 23 and 24, in which the main shaft is revolubly supported.

Around the grip wheel I place a wire rope cable 33, which I term the grip cable, which extends to two winding drums 34, as shown in Figs. 7 and 8. One end of the grip cable is wound on one of the drums 34 and the other end on the other drum 34, and both are preferably wound the same way on both drums. These grip rope winding drums are operatively connected to or mounted on any suitable winding drum engine.

A load hoisting cable 35 is secured to the two load hoisting drums, one end of the cable being secured to the drum 13 and the opposite end to the drum 14, and both being arranged to be wound in the same direction. The loop end of the cable of the load winding drums passes around a sheave 36, which is rotatably secured in the upper end of a yoke 37, on a pin 38, a hook 37^{A}, being swiveled to the lower end of the yoke. In the center portion of the inner pendants 15, I form two lugs 39, in which apertures 40, are formed, to which I pivotally secure the opposite ends of a semi-circular shaped pull rod 41, which spans the front side of the grip wheel. In the center of this pull rod I form an eye 42, to which I secure one end of a haul back line 43, which extends to the tower 20, and passes between two sheave wheels 45, and 46, and also passes around the sheave wheel 46, from which it extends to and between the sheave wheels 29, and 30, at the lower end of the pendants 15, which act to hold it up in operative relation to the hoist. The sheaves 45, and 46, are pivotally mounted on pins 48, which are secured in the slotted ends of yoke straps 49, which are pivotally bolted by a bolt 50, to the tower 20.

In hoisting devices of this kind, when loads are picked up from the ground from points considerably to one side of the vertical center of the hoist, the hoist is apt to tilt on the track rope more or less in the direction of the pull on the rope, which causes the drums to assume a more or less inclined position to the horizontal plane, which is very apt to cause the hoisting rope to cross itself and also to wind up in a bunch on the drums and when the load is raised and the hoist and load swings into the vertical plane, the bunched rope will slip off onto the unwound portion of the drum causing the load to drop, which tends to fray and break the strands of the rope and is liable to break the rope itself. In order to obviate this defect in cable hoists and to insure the even winding of the hoisting rope on the drums in progressive order from one side of the drum to the other, I provide a device that will guide the rope in progressive order across the drums. I preferably carry out this feature of my invention in the following manner: To the opposite ends of the shaft 12 I pivot arms 50^{A} which extend downward from the shaft to a point beyond the periphery of the grip wheel and at an angle to a vertical line, and to the ends of the arms I secure either one or two rods which extend beneath the drums substantially parallel with their axis. One rod 51 may be used as shown in Fig. 6, or two rods 51 and 52 may be used as shown in the other figures. In either case the guide rod 51 is threaded with reverse threads of a pitch equal to the diameter of the hoisting rope used on the drums. I preferably use two rods 51 and 52, and space them far enough apart to mount on them four rope sheaves 53 and 54, two of which, 53, are centrally bored and oppositely threaded to screw loosely on the right and left hand threads of the threaded rod; the other rod is a plain rod, upon which the sheaves 54 are loosely and slidably mounted. Each pair of sheaves are positioned to stand opposite one another, and two sets of sheaves are used, one set for each drum, so that the ends of the rope will pass between each set. The threaded sheaves are the rope guide sheaves and are driven by the friction of the rope against them. The other sheaves are followers and serve only to hold the rope in engagement with the guide sheaves. When but one rod is used, the threaded rod is used and the plain rod and the follower sheaves are dispensed with. The reverse threads on the threaded rod are

adjusted to suit the direction or order of winding the ends of the rope on the two drums. I preferably wind from the inside end of each drum outward; consequently, the rod is provided with reverse threaded portions that extend from the opposite ends of the rod a distance equal to the length of the drums. Each reverse thread consists of a right and left hand thread. To insure that the follower sheaves will retain their position opposite the guide sheaves, and thus prevent the rope when slack from jumping out of the guide sheaves, the rim flanges of the guide sheave may be extended to overlap or straddle the flanges of the follower sheaves. By means of this device the ends of the hoisting rope are wound in progressive order from one side of the drums to the other and vice versa, the threaded sheaves reversing their direction of movement at the ends of the drums while still rotated in the same direction by the rope. While the above device for progressively winding the hoisting rope on the drum is not an essential element of my improved hoist, it is a valuable and useful improvement for some kinds of work.

The operation of my improved cable hoist conveyer is as follows: When it is desired to move the hoist towards the tower, the ends of the grip rope are both let out from both drums 34 at the same time, while the haul back rope is wound up on the drum 34^a and pulls the hoist along the rope in the direction of the tower 20; to move in the opposite direction, the two drums are made to wind the grip wheel rope and the drum 34^A is made to unwind the haul back rope. The winding and unwinding of the hoisting rope is effected by the rotation of the grip wheel, which, when rotating in an anti-clockwise direction, winds the load hoisting rope up on both drums and raises the load, and when rotated in the opposite direction unwinds and lowers the load. In case it is desired to hold the hoist in a fixed position, and raise or lower a load, one of the drums 34 is rotated to wind and the other drum 34 to unwind which actions will rotate the grip wheel to hoist a load, and the haul back rope being held stationary will hold the hoist from moving in the direction of the pull of the grip rope, and in lowering, the grip rope drums are rotated in reverse direction to those in hoisting.

Another feature of the hoist is that loads at the tower can be either hoisted or lowered while being conveyed and the direction of hauling can be reversed by the proper manipulation of both the grip wheel and haul back ropes.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a cable hoist conveyer, the combination with the towers, and the track rope, of the pendent frames, the trolley wheels rotatably mounted in said pendent frames, a shaft journaled in said pendants, a cable grip wheel secured to said shaft and a cable mounted on said grip wheel, having its opposite ends operatively attached to and wound on suitable power driven cable drums, and a haul-back cable attached to the frame carrying said grip wheel substantially as described.

2. In a cable hoist conveyer, the combination with the towers and the track rope supported thereby, of the pendent frames, the trolley wheels rotatably mounted in said pendent frames, a shaft journaled in said pendent frames, a cable grip wheel secured to said shaft, a cable drum secured to said shaft on each side of said cable grip wheel, a cable mounted on said cable grip wheel, a pair of cable winding, power-driven drums operatively secured to the ends of said grip wheel cable, a hoisting cable secured at its ends to hoisting drums and operatively supporting a material lifting hook, a haul back cable secured at one end to said pendants and movably supported by suitable sheaves to one of said towers, and extending back to and supported by said pendant, and having its opposite end extend from its support on said pendant and secured to and wound on a power driven winding drum, substantially as described.

3. In a cable hoist conveyer, the combination with the towers and the track rope, of the trolley pendant, the shaft journaled in said trolley pendant, the cable grip wheel and the hoisting drums and cable mounted on said shaft, of the cable guide sheaves rotatably journaled in said pendants below said grip wheel, the guide sheaves rotatably secured to one of said towers and the haul back cable secured at one end to said pendants, and extending from said pendants through the guide sheaves of said tower and from the guide sheaves of said tower through the guide sheaves of said pendant, and secured to its opposite end to a cable operating power drum, substantially as described.

4. In a cable hoist conveyer, the combination with the towers and the track cable supported thereby, of the two Y and forked shaped pendent frames arranged one over the other at their top portions and having the inner pendent frame extend below the outer pendant, a shaft mounted at each of the ends of said Y portions of said frames, a trolley sheave rotatably mounted on each of said shafts, and mounted on said track rope, a shaft journaled at the center of said Y shaped pendants, and at the lower ends said forked shaped pendants, a cable grip sheave secured to said shaft between said Y shaped pendants, two journal pins secured to the lower end of said Y shaped pendants, one above the other, cable sheaves journaled on said journal pins to register in alinement with

one another, and cable winding drums secured on said center shaft on each side of said cable grip wheel and between said inner and outer pendent frames, substantially as described.

5. In a cable hoist conveyer, the combination of the towers and the track rope the pendent trolley, the cable grip sheave, the grip cable, the haul back cable and its supporting sheaves, and the hoisting drums and hoisting cable and material lifting hook, with an automatic cable winding guide device for said hoisting drums, comprising arms projecting from said grip sheave shaft; a threaded rod supported by said arms, and extending across said drums, a reverse thread on said rod, registering opposite each drum, of the same pitch as the diameter of said drum's cable, and a cable sheave threaded to said reverse thread and arranged to receive and guide said cable reciprocally across said drums as said cable is wound on said drums, substantially as described.

6. In a cable hoist conveyer, the combination of the trolley pendants, the cable grip wheel, the hoisting drums and the hoisting cable, with the reverse threaded rod secured in front of said drums, the cable sheaves threaded to said rod, and adapted to guide said cable onto said drums in progressive order, substantially as described.

7. In a cable hoist conveyer, the combination with the trolley pendant, the cable grip wheel and the cable hoisting device and hoisting cable, of arms projecting from the shaft of said grip wheel two rods secured to said arms across the front of said drums, a reverse thread portion on the inner rod opposite each drum, of the same pitch as the diameter of said hoisting cable, and of the same length as each of said drums, a cable sheave threaded to each reverse threaded portion of said rod, cable sheaves loosely and slidably mounted on said second rod, and arranged to stand in alinement with and to move with said threaded sheaves, and having said threaded sheaves arranged and adapted to receive and guide said hoisting cable in progressive order on said drums, substantially as described.

8. In a cable hoist conveyer, the combination with the pendant, the cable grip wheel and the hoisting drums and hoisting cable, of a progressive cable winding device for said hoisting drums, comprising sheaves supporting said hoisting cable and a reverse threaded journal upon which said sheaves are threaded and are arranged to rotate and travel reciprocally across the face of each of said drums, substantially as described.

9. In a hoist conveyer, a track, a trolley on said track, a wheel carried by said trolley comprising a hub portion shell metal side flanges, secured at their central portions to said hub portions, an introverted circular band portion at the periphery of each side portion, an angle plate ring secured to the inside of each of said side flanges, at a predetermined space below said band portions and a circumferential row of operating cable gripping jaws, loosely seated at their outer ends in the annular space between said band and angled ring portions, hoisting mechanism actuated by said wheel, a cable passing over said wheel, independent winding drums receiving the ends of the cable, and a separate back-haul cable connected with said trolley, substantially as described.

10. In a hoist conveyer, a track, a trolley on said track, a wheel carried by said trolley comprising the cast hub portion, the sheet metal side flanges the annular recesses on the inner side of each side flange the circumferential row of cable gripping jaws, each pair of dogs being pivoted together at their centers and having their heel ends loosely pivoted in said annular space and a loose ended expanding ring spring, operatively supported between said flanges to bear resiliently against the under side of the center of said cable gripping jaws, hoisting mechanism actuated by said wheel, a cable passing over said wheel, independent winding drums receiving the ends of said cable, and a separate back-haul cable connected with said trolley substantially as described.

11. In a cable hoist conveyer, the combination of two towers erected at predetermined distances apart, a track cable rope secured at its opposite ends to said towers, a pendant mounted on said cable track rope to run on said track rope, hoisting drums operatively supported by said pendent trolley, a hoisting cable operatively supported on said drums, a haul back cable operatively secured to said pendant and extending to and supported on a sheave rotatably secured to said tower, and extending back and supported by a sheave on said pendant and having its opposite end attached to a cable operating power winding drum and means including a cable and suitable power operated winding drums, for operating said hoisting drums, substantially as described.

12. In a cable hoist conveyer, the combination with the towers and the track cable secured thereby, of a pendent trolley mounted on said track cable, a haul back cable arranged to move said pendent trolley in one direction of its movement on said track cable, operative material lifting hoisting drums mounted in said pendent trolley and means including a cable and separate cable operating winding power operated drums to operate said hoisting drums and move said pendent trolley in the opposite direction of its movement on said track cable, substantially as described.

13. In a cable hoist conveyer, the combination of the towers and the track cable, of a

pendent trolley mounted on said track cable, a cable grip wheel mounted in said pendant in vertical alinement with the trolley of said pendant, a hoisting drum rotatably mounted in said pendent trolley on each side of said cable grip wheel, a looped hoisting cable operatively secured to said hoisting drums, a haul back cable operatively secured to said pendant and one tower to move said pendent trolley in one direction of its movement, and a grip wheel cable operatively arranged to operate said hoisting drums and to move said pendent trolley in the opposite direction of its movement on said cable track, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

BYRON C. RIBLET.

Witnesses:
G. SARGENT ELLIOTT,
BESSIE THOMPSON.