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W. D. SHERMAN.

HOISTING AND TRANSFER APPARATUS.

No. 518,901. Patented Apr. 24, 1894.

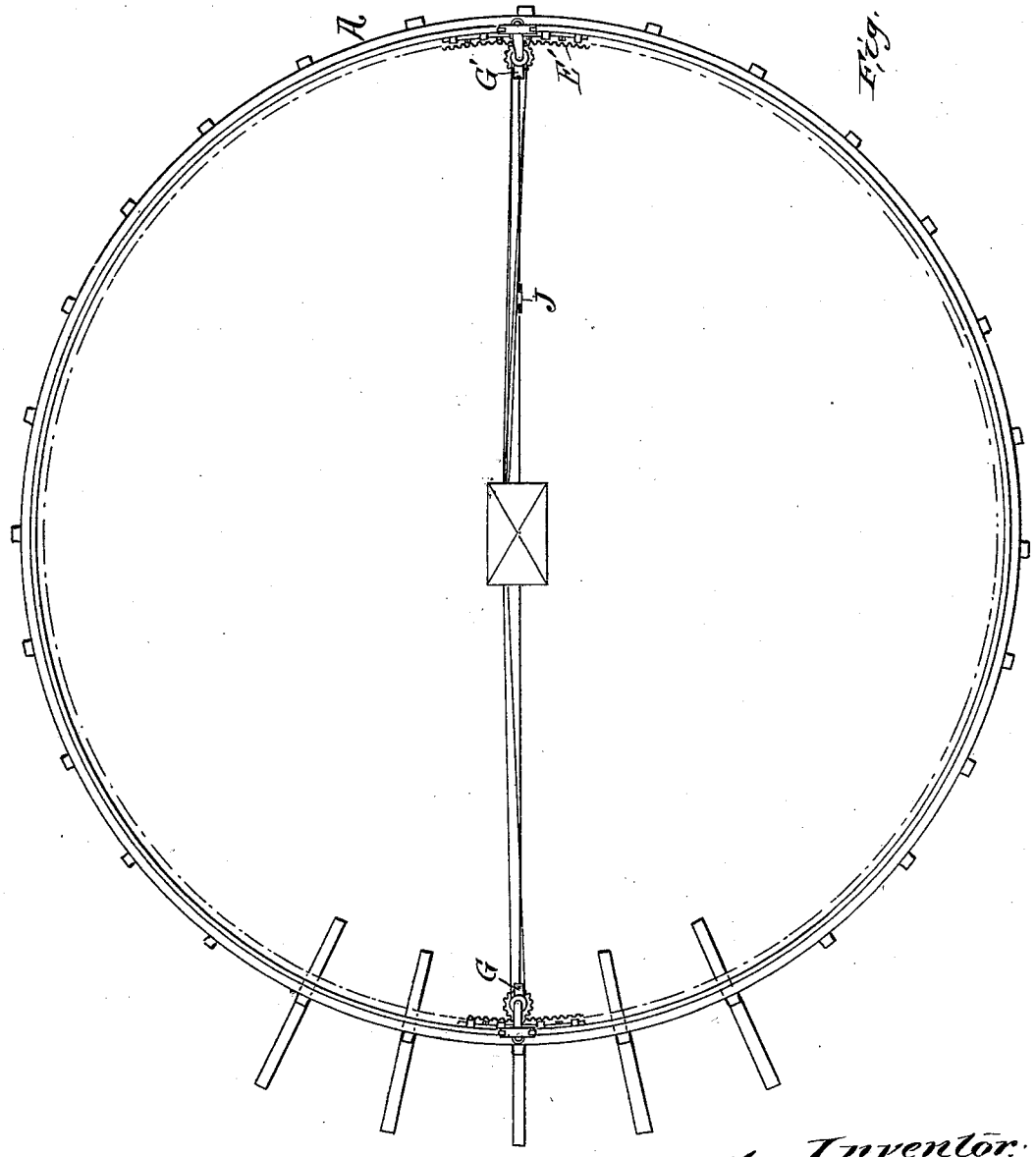

Fig. 1

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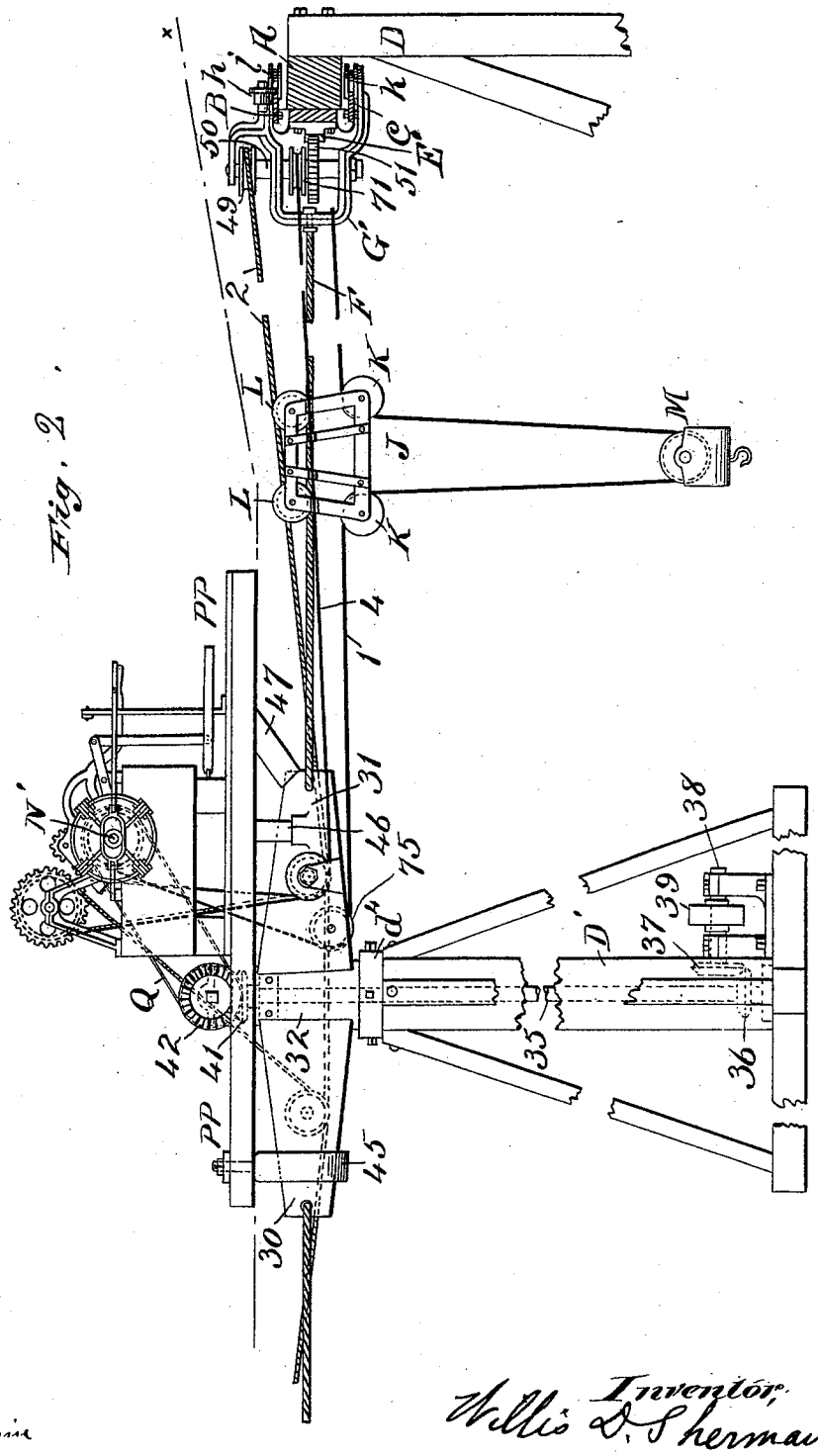
Fig. 2.



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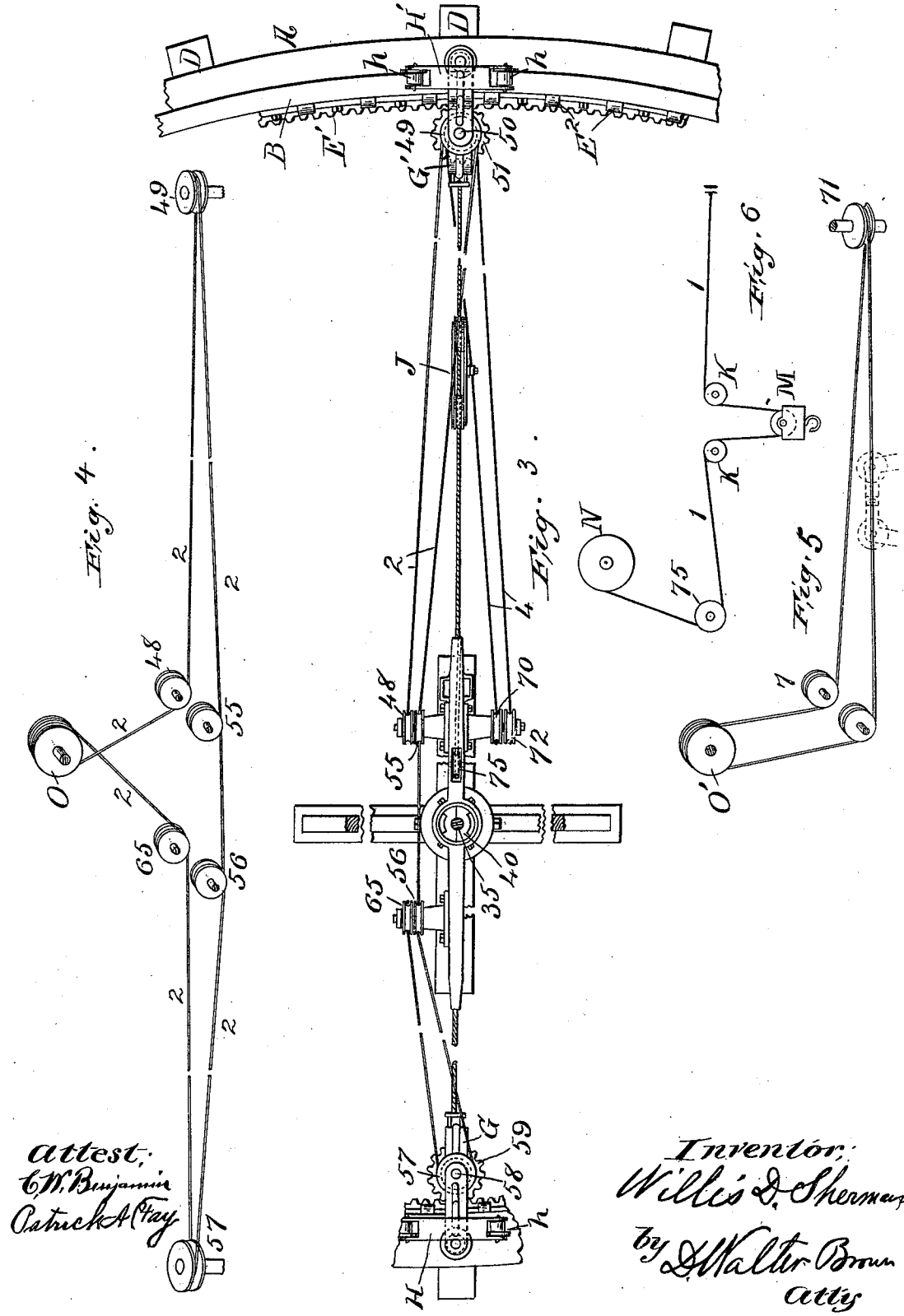

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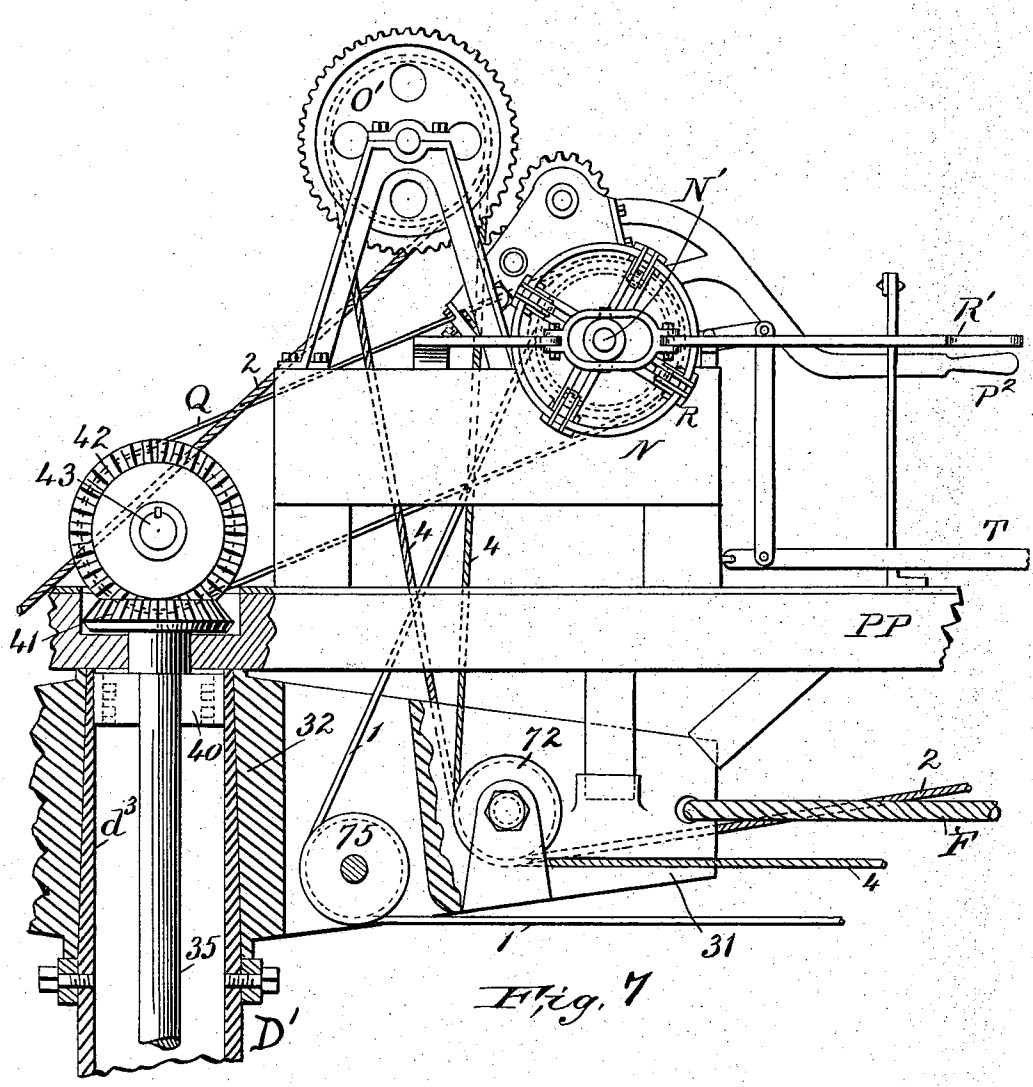

Fig. 7

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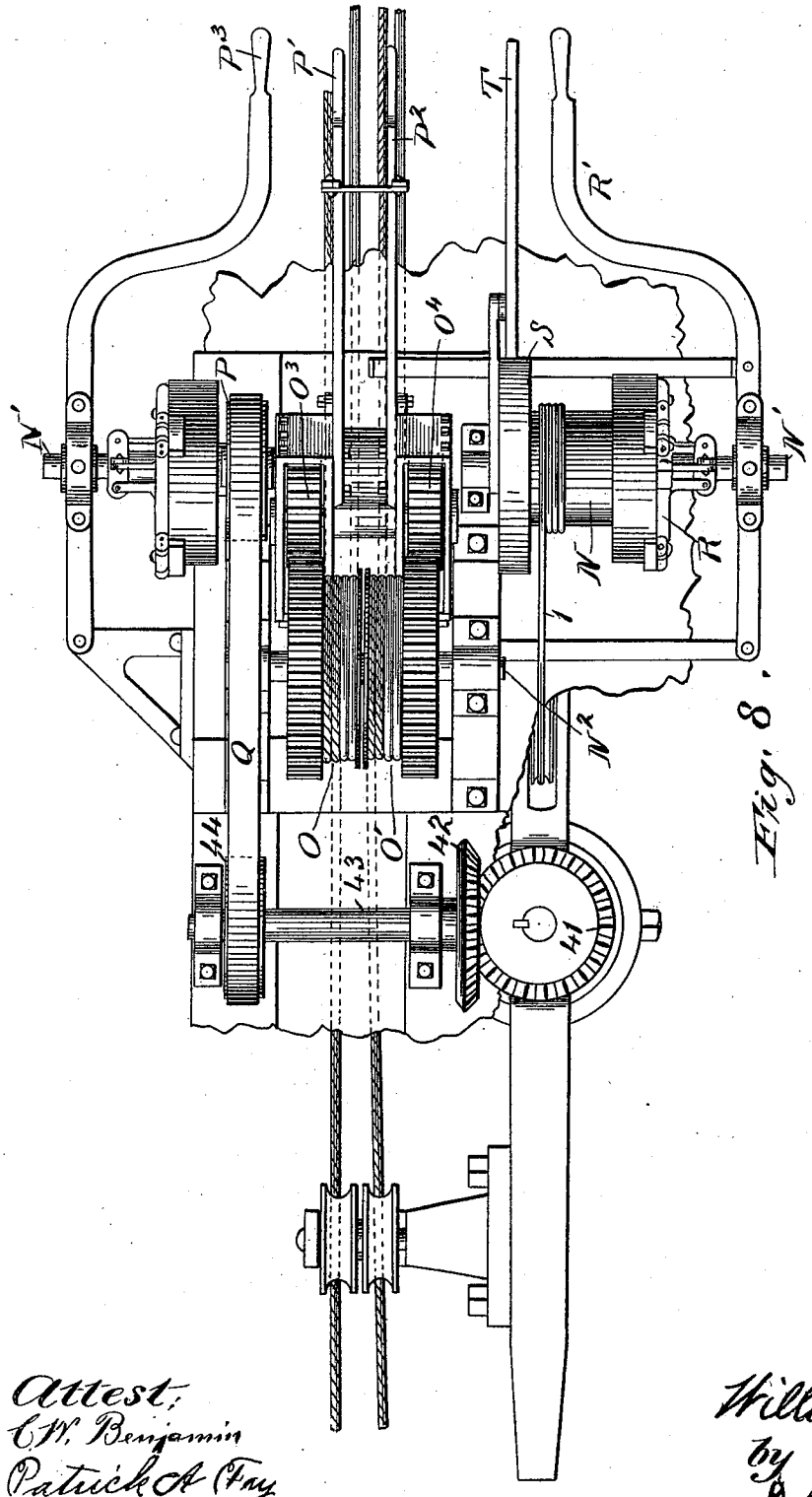

Fig. 8.

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UNITED STATES PATENT OFFICE.

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HOISTING AND TRANSFER APPARATUS.

SPECIFICATION forming part of Letters Patent No. 518,901, dated April 24, 1894.

Application filed January 16, 1894. Serial No. 497,115. (No model.)

To all whom it may concern:

Be it known that I, WILLIS D. SHERMAN, a citizen of the United States, and a resident of Brooklyn, in the county of Kings, State of New York, have invented certain new and useful Improvements in Hoisting and Transfer Apparatus, of which the following is a specification.

This invention relates to apparatus for hoisting and transferring from one point to another within a yard or work shop, heavy articles, such as sewer pipe, blocks of stone or cement, castings of all kinds, or heavy pieces of machinery, and ordnance in finished and unfinished condition.

The invention especially relates to that type of hoisting and transfer apparatus wherein the carriage which carries the trolley-cable or bridge moves on the arc of a circle, the said cable or bridge constituting a radius of said circle, and rotating about the center thereof.

Referring to the drawings which accompany the specification to aid the description, Figure 1 is a diagrammatic plan view of the apparatus as a whole, but does not show the supports of the circular track. Fig. 2 is a side elevation, partly broken, on a larger scale, showing the center support and shaft, machinery, platform, cable track, and carriage with pinion, and indicating the relative positions of the carriage, trolley, and fall ropes. The carriage on the left side is not shown. Fig. 3 is a plan view, partly broken, and taken on the line X of Fig. 2. It shows the central driving shaft coming up through the revolving arms or cross heads to which the cable track is attached, and indicates the arrangement of the carriages with their sheaves and pinions, and the carriage-rope and trolley-rope. For clearness the guide sheaves are indicated more out of the central line than they are in practice. Figs. 4, 5, and 6 are respectively diagrammatic representations of the carriage rope, trolley rope, fall rope and their respective sheaves. Fig. 7 is a side elevation, on a very large scale, of the hoisting and transfer drums and gearing, and showing the construction of the revolving cap which carries the revolving arms and platform. Fig. 8 is a plan view of the parts shown in Fig. 7, and on the same scale.

A is the track for the carriages provided with upper rail B, and lower rail *c*, arranged in a horizontal circle, and supported by braced posts D. The track A instead of being a complete circle, might be any part thereof, as an arc of one hundred and eighty degrees, ninety degrees, forty-five degrees, &c. The carriages which travel on the tracks A are provided with the yokes G or G′, top traveler H, H′, top wheels *h*, *h*, which run on the rail B, grooved wheels *i*, *k* running respectively on the edges of the top and bottom rails B, C. In practice I prefer to have the track A form a complete circle and to arrange two carriages at the extremities of a diameter thereof, (Figs. 1 and 3.) The trolley bridge or cable F leads from the yokes G, G′ to the heavy cross head or arms, 30, 31 of a collar 32, which works on a cone d^3 that is supported by a central vertical standard D′. Said standard D′ is placed exactly at the center of the circular track A and provided with a ring or shoulder d^4 to support the collar 32. Up through the standard D′ works shaft 35, which is driven through bevel gear 36, from any suitable motor.

In Fig. 2 the gear 36 is represented as driven by bevel gear 37 on a horizontal shaft 38, provided with belt pulley 39. Said shaft 35 works through the aforesaid cone d^3 on which the collar 32 is pivoted, and through bushings 40, centered in said cone (Fig. 3), and carries a bevel gear 41, which meshes with similar gear 42 on a counter shaft 43, provided with a belt pulley 44, from which the belt Q drives the pulley P that is loose on the main shaft N′ of the hoisting and transfer machinery.

N is the hoisting winch arranged to be thrown in or out of operation by the clutch R, operated by the lever R′.

S is a brake for the winch N, operated by the lever or treadle T. Thus the winch N can be revolved as desired to raise a load, and when the winch is disengaged from the shaft N′ to lower a load, the speed of the winch may be controlled by the brake S.

O O′ are drums movably journaled on a

shaft N^2, and each provided with a circumferential cog wheel adapted to engage a pinion which, through intermediate reversing mechanism (indicated by O^3, O^4, Fig. 8) receives motion from the shaft N'. Said reversing mechanism is well known and does not require detailed description.

To operate the drum O the lever P' is raised or lowered to engage the reversing mechanism O^3, O^4, with and revolve said drum O in the desired direction, and then by lever P^3 a clutch R^4 is engaged on the pulley P and the shaft N' revolved, which through said mechanism O^3, O^4, revolves the drum O. Similarly to revolve the drum O' the lever P^2 is raised or lowered to engage the reversing mechanism O^4 with the said drum O', then the shaft N' is revolved through lever P^3 and clutch R^4 as before. Thus the winch N and drums O O' may be each operated independently of the others, and one or two of said winches and drums may be revolved in opposite directions, and the movements and changes of movement of each may be effected without stopping the pulley P. In this manner the movements of the trolley rope 4, carriage rope 2, and fall rope 1 become entirely independent of each other, and the movements of the load in rising, descending, or passing over the yard are effected without delay. It will be seen that said hoisting machinery is supported on the platform P P, which is carried by the revolving arms 30, 31, being connected therewith in any suitable manner, as by strap 45 and brackets 46, 47.

The carriages are operated through the endless carriage rope 2, which being wound on the drum O, descends through the platform P P to a sheave 48, going thence around a horizontal sheave 49, fixed on a shaft 50 journaled in the yoke G', at the left side of Figs. 1, 2, and 3. On said shaft 50 is fixed a pinion 51, which meshes with a concave-circular rack E', which is bolted on blocks E^2, secured to the inside of the track beams A. Said carriage rope 2 may, if desired, be wound around the sheave 49, to give necessary friction, and thence doubling on itself, goes to a guide sheave 55 on arm 31, to a guide sheave 56 on arm 30, thence around a sheave 57, fixed on a shaft 58 journaled in the yoke G of the right hand carriage (Fig. 3). Said shaft 58 carries a pinion 59 which meshes in the rack E', similar to pinion 51. From sheave 57 the carriage rope 2 goes to a guide sheave 65, and rises to the drum O, and I prefer to cross the lengths of said rope 2 below the drum O, as seen in Fig. 4. Thus, when the drum O revolves, the pinion 51 will also revolve and will move the right hand carriage in the opposite direction. At the same time the pinion 59 of the left hand carriage will be revolved in the same direction as pinion 51 and at the same speed. The result is that pinions 51 and 59 cause the two carriages to travel around the track A at the extremities of a diameter thereof, the carriages revolving the arms 31, 32 on the cone d^3, and with them the platform P P and hoisting apparatus.

The trolley J is provided with track wheels L L, and sheaves K K, and is operated on the cable bridge, F, by the trolley rope 4, in the following manner: Said rope 4 being wound around its drum O', descends to a guide sheave 70 on the revolving arm 31, thence goes to the trolley where it is fastened, thence continues to the right hand carriage and around a sheave 71 freely journaled on the axle 58 of the before mentioned sheave 57; there doubling on itself, it returns to a sheave 72 on the arm 31, and ascends to the drum O', thus completing its circuit. Manifestly as said drum O' revolves in one direction or the other, the trolley J will travel in or out on the cable bridge F. The fall rope 1, being fixed at one end around the winch N, descends to a guide sheave 75 on the arm 31, thence over the sheave K on the trolley down to the fall block M, up to the sheave K on the trolley and across to the right hand carriage, to which it is fastened.

From the foregoing description, it will be evident that with a circular track as described, the load may be raised from any point within the circumference of the track, and carried to any other point, and the movements of the carriage, the trolley, and the fall block M can each be regulated independently of the other movements.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In hoisting and transfer apparatus, the combination of a track shaped on a circular arc; a pivotal support at the center of said arc, a carriage traveling on said track; a trolley bridge attached at one end to said carriage, and at the other end to said pivotal support; a trolley on said bridge and cables for operating said carriage and trolley, substantially as described.

2. In hoisting and transfer apparatus the combination of a track shaped on a circular arc; a rack thereon; a carriage traveling on said track and provided with a pinion meshing with said rack; an endless cable for operating said pinion, and a drum for said cable, substantially as described.

3. In hoisting and transfer apparatus the combination of a track shaped on a circular arc; a pivotal support at the center of said arc, a rack on said track; a carriage traveling on said track and provided with a pinion meshing with said rack, a trolley bridge attached at one end to said carriage, and at the other end to a pivotal support at the center of said circular arc; a trolley traveling on said trolley bridge; a fall rope carried by said trolley, a carriage rope for operating said pinion; a trolley rope for operating said trolley, and drums for said carriage rope said

trolley rope and said fall rope all actuated from a shaft pivoted at the center of said circular arc, substantially as described.

4. In hoisting and transfer apparatus, the combination of a track, a carriage adapted to travel thereon, a bridge operated by said carriage, a trolley adapted to travel on said bridge, and a fall rope carried by said trolley, a power shaft, and a hoisting engine adapted to be driven from said power shaft, and a main shaft and a plurality of drums which are adapted to be independently driven from said main shaft, and any two of which drums are also adapted to be simultaneously revolved in opposite directions, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 8th day of December, 1893.

WILLIS D. SHERMAN.

Witnesses:
W. H. S. CARLILE,
JOHN J. DONLEN, Jr.