

J. KRAMER, F. O. KUEHNE, JR., AND W. H. KOPPLIN.

POWER TRUCK.

APPLICATION FILED JAN. 19, 1922.

Patented July 25, 1922.

4 SHEETS—SHEET 1.

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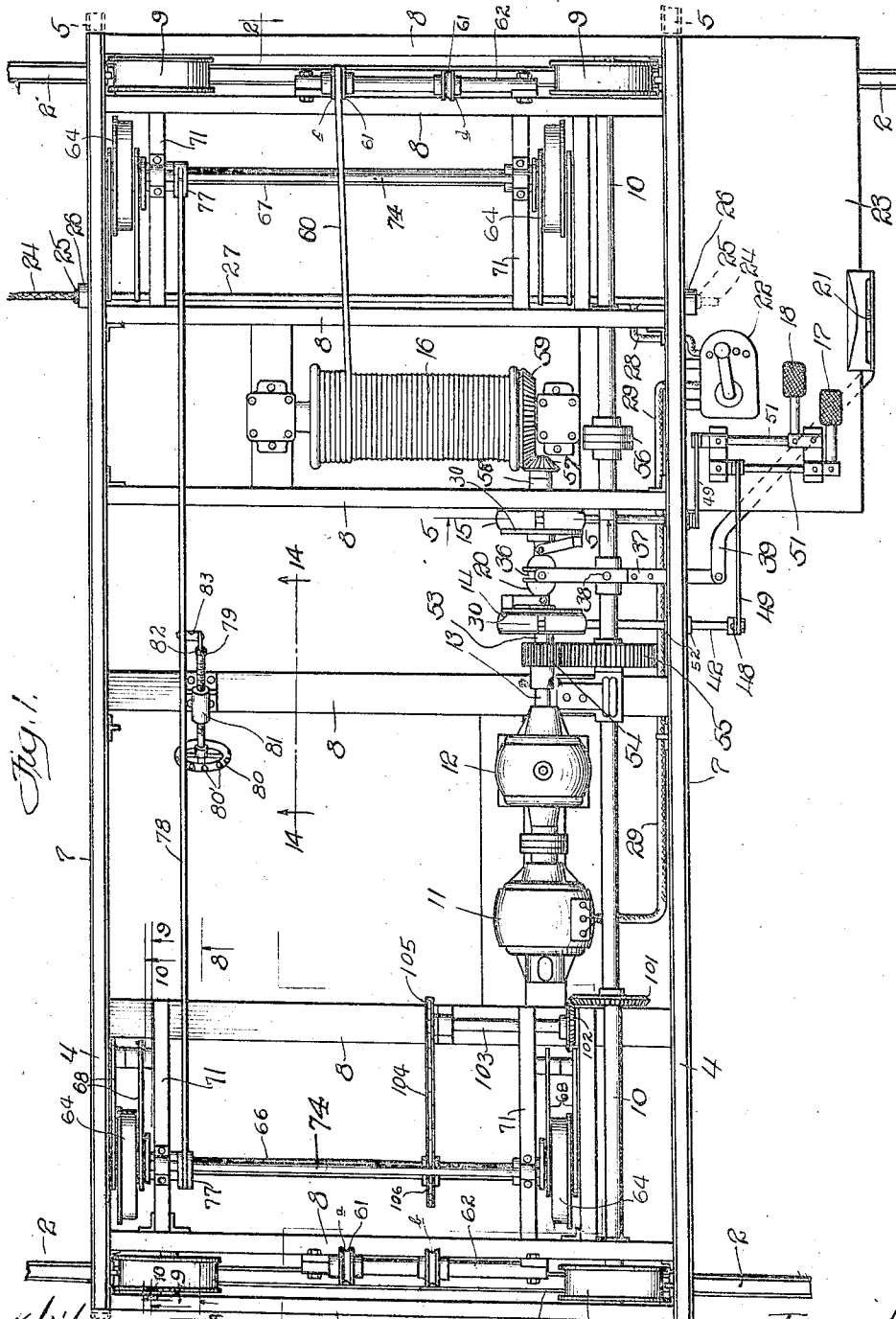


Fig. 1.

Witnesses:
W. C. O'Brien
T. M. Davis

Inventors:
Julius Kramer
Walter H. Kopplin
F. O. Kuehne Jr.
By Rummel & Rummel, Attys.

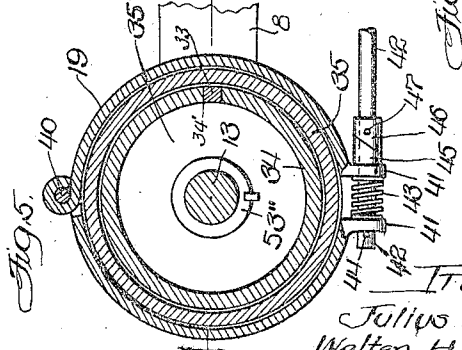
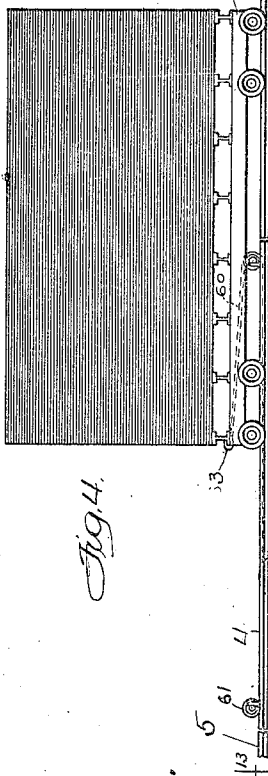
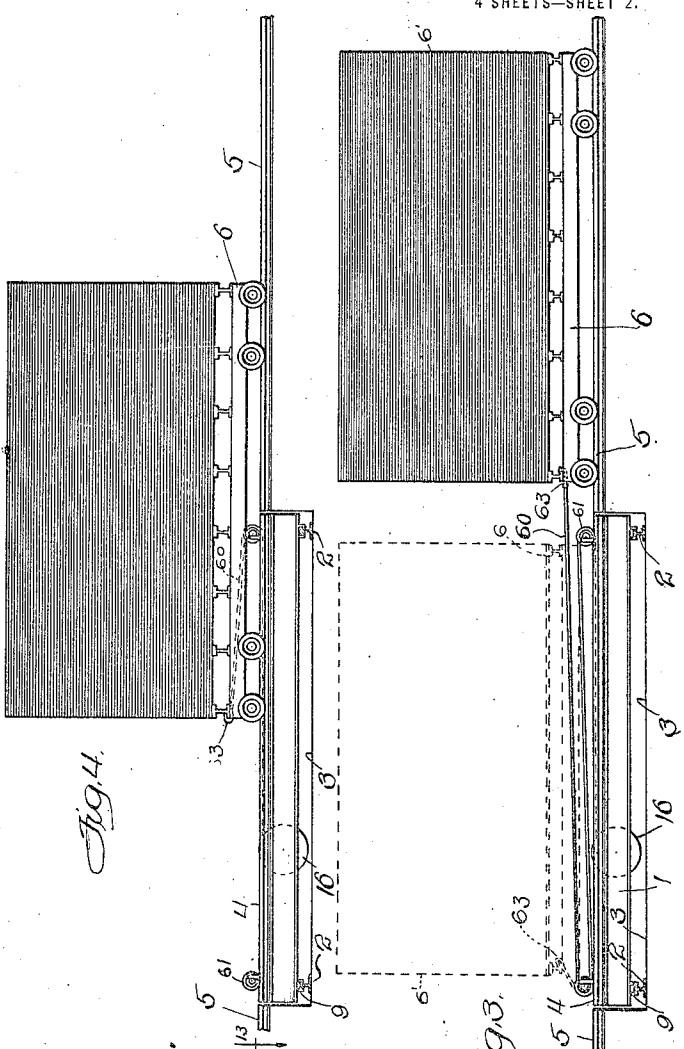
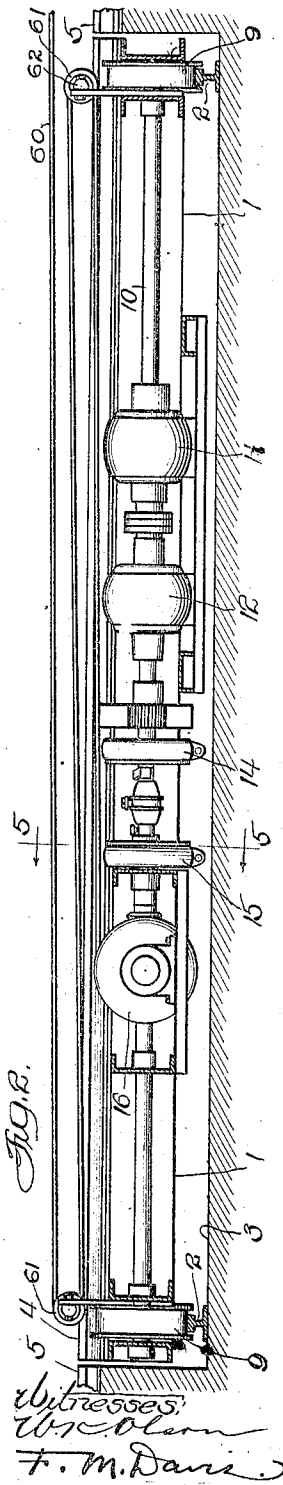
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Julius Kramer
Walter H. Kopplin
Fred O. Kuhne Jr.
By *Rummler & Rummler Attys.*

Witnesses:
W. C. Olson
F. M. Davis.

J. KRAMER, F. O. KUEHNE, JR., AND W. H. KOPPLIN.

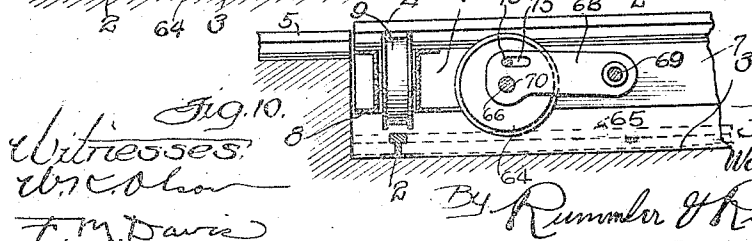
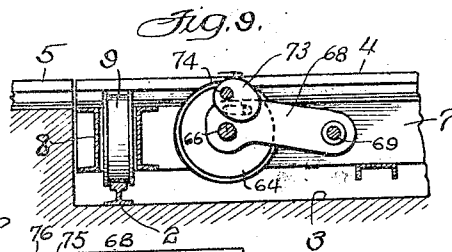
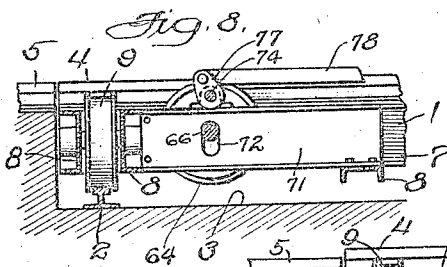
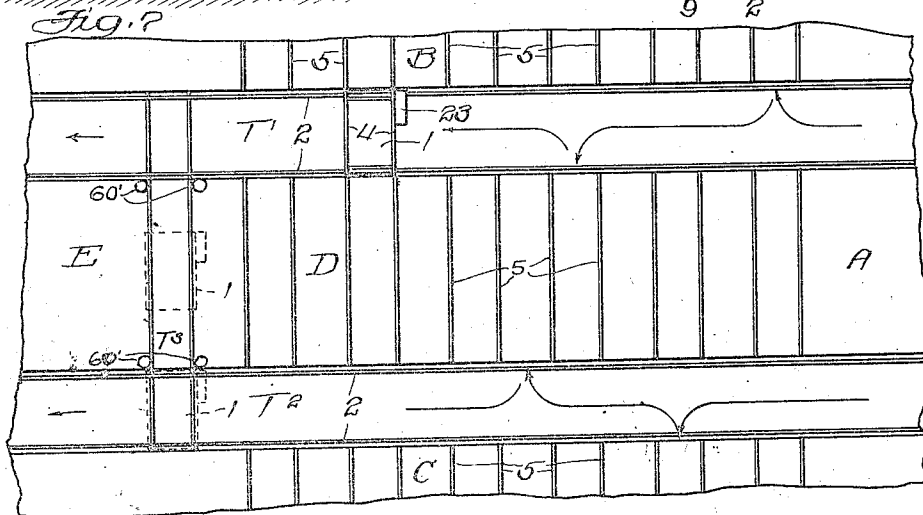
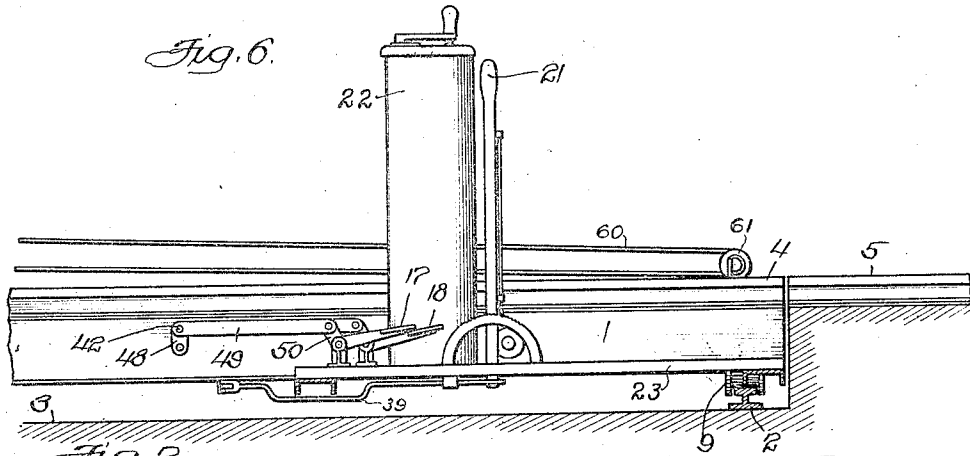
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W. C. Olson
T. M. Davis

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Julius Kramer
Walter H. Kopplin
Fred O. Kuehne Jr.
By Rummel & Rummel Attys

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4 SHEETS--SHEET 4.

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Fig. 11.

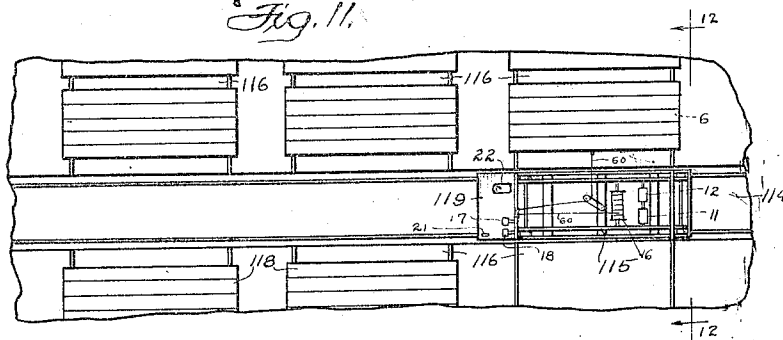


Fig. 12.

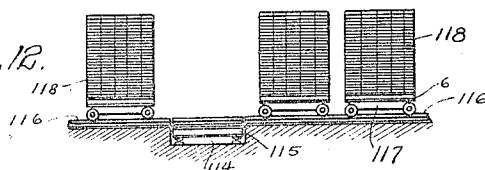


Fig. 13.

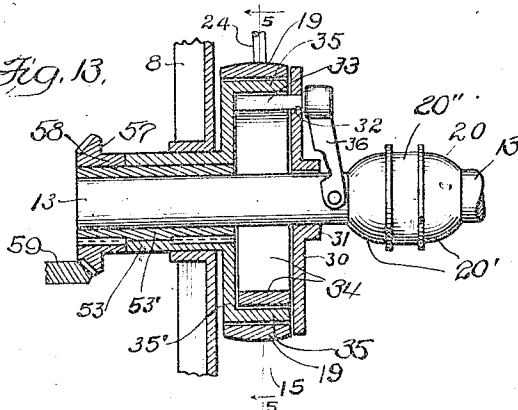
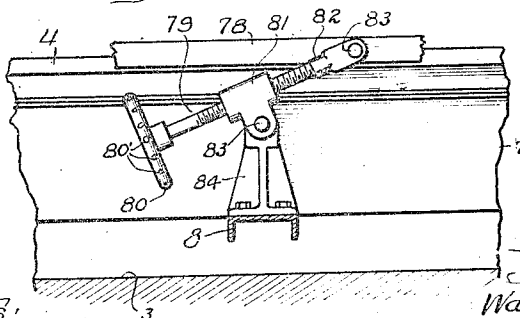


Fig. 14.



Witnesses:

W. H. Kopplin

F. M. Davis

By

Rummler & Rummler Attys.

Inventors:

Julius Kramer,

Walter H. Kopplin,

Fred O. Kuehne Jr.

UNITED STATES PATENT OFFICE.

JULIUS KRAMER, FRED O. KUEHNE, JR., AND WALTER H. KOPPLIN, OF CHICAGO, ILLINOIS, ASSIGNORS TO PULLMAN DAVENPORT AND UPHOLSTERED FURNITURE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

POWER TRUCK.

1,423,947.

Specification of Letters Patent. Patented July 25, 1922.

Application filed January 19, 1922. Serial No. 530,272.

To all whom it may concern:

Be it known that we, JULIUS KRAMER, FRED O. KUEHNE, JR., and WALTER H. KOPPLIN, citizens of the United States of America, and residents of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Power Trucks, of which the following is a specification.

10 This invention relates to power trucks or transfer cars mainly similar in general character to the device shown in the copending application, Serial No. 433,017, filed December 24, 1920, particular reference being had to trucks adapted for use in the handling of lumber in and about storage yards, drying rooms or kilns, factories and the like, and also for use in brick-yards. The present invention, however, involves additional functions and includes many advantageous features of novelty not provided for in the prior case.

25 The main objects of this invention are to provide a transfer car having a greatly extended range of operative utility; to provide such a car, and track accessories therefor, adapted to accommodate movement in at least two abruptly different lines of direction; to provide for non-turning accommodation of the car to such movement; to provide for endwise travel of said car from one of two parallel tracks or railways to another; to provide a drying room or kiln with parallel transfer tracks one on each side, a transfer car common thereto and means to effect ready transfer of said car from one track to the other; to provide ready electric current supply means independent of trolleys, conducting rails or sliding contacts; to provide an improved construction and organization of the clutch, brake and control mechanisms of the truck, especially with respect to the clutch and drive gear means for the drum, and traction wheels; to provide for greater accuracy of control and specifically to enable the operator to positively stop the truck instantly at any desired point along its trackway, and to stop the winding drum in like manner; to enhance convenience, comfort and facility of operation and use of the truck on the part of the control-operating attendant; to provide for simplifying the necessary manual

part of the operation of loading the material-unit "bunks" onto the truck and subsequent removal thereof; to provide for one-way drive of the winding drum both for loading and unloading; to provide for complete loading and unloading of the transfer car by the drum operated cable, both for one-way and reverse movement of the "bunks", and without any intermediate "re-threading" of the cord; and to provide for using either the "end piling" or "cross piling" method, as will be explained, each with their respective advantages.

Two illustrative embodiments of this invention are shown in the accompanying drawings, in which Figures 1 to 10 show one embodiment and Figures 11 and 12 another embodiment.

Figure 1 is mainly a plan of the truck, ready to receive a load.

Figure 2 is a vertical longitudinal section on the line 2—2 of Fig. 1.

Figure 3 is a reduced scale back side view of the truck together with an adjacent track having a loaded lumber car or "bunk" thereon ready to be drawn onto said truck.

Figure 4 is a similar view except that the "bunk" is shown at an intermediate position as in unloading the truck.

Figure 5 is an enlarged section through one of the clutch and brake members on the line 5—5 of Fig. 1.

Figure 6 is mainly a side view or front elevation of the right end part of the truck as viewed in Fig. 1, and shows especially the operator's platform and control means.

Figure 7 is an illustrative conventional plan of a track layout for a lumber dry-kiln and storage yard or shed, adapted for "end piling".

Figure 8 is a detail, partly in section, on the line 8—8 of Fig. 1 showing the wheel alternation control means.

Figure 9 is a detail of similar character on the line 9—9 of Fig. 1.

Figure 10 is a detail also of similar character, on the line 10—10 of Fig. 1.

Figure 11 is a diagrammatic plan of an embodiment adapted to accommodate "cross piling" as distinct from the "end piling" method of Figs. 3, 4 and 7.

Figure 12 is an upright end view from the right of Fig. 11,

Figure 13 is a section at 13—13 on Fig. 5. Figure 14 is an enlarged section at 14—14, on Fig. 1.

In Figs. 1 to 10 the equipment is designed and arranged for the "end piling" method; that is to say the lumber is arranged endwise to the transfer car and track when on the sidings. It moves endwise onto and off from the transfer car which is disposed crosswise of the transfer track.

In Figs. 11 and 12 the design and arrangement is for "cross piling", in which case the lumber moves crosswise onto and off from the transfer car, which in this instance is disposed lengthwise of the transfer track and the lumber on the sidings all lies side-wise to or parallel with the transfer track.

The former arrangement is somewhat the more convenient respecting accessibility to any particular pile or bunk-load of lumber, but the latter is much the more economical of transfer-track space.

In the construction shown in the drawings of the "end piling" embodiment, Figs. 1 and 7, the power truck or transfer car 1 is mounted on a pair of widely spaced rails 2 disposed along the depressed runway or roadbed 3, so as to bring the receiving rails 4 of said truck flush with the laterally extending stationary rails 5 when the truck is brought into alinement therewith for transferring loaded material cars or bunks 6 either onto or off from said truck.

The truck 1 comprises mainly a rectangular frame of oblong shape including side beams 7 and cross beams 8. Said truck is arranged to travel sidewise along the tracks 2. For this purpose four wheels 9 are provided at the corners respectively, two of which on one side are fixed to the driving shaft 10 for positive turning therewith. Other wheels are also provided for endwise movement as will be explained.

The power for the truck 1 is supplied by an electric motor 11 mounted on the main frame, and said motor is connected through a speed reducing gear box 12 to a jack-shaft 13. The shaft 13 is provided with a pair of combination clutch and brake members 14 and 15 for driving the traction shaft 10, and winding drum 16 respectively. The members 14 and 15 are each provided with a brake setting member 17 and 18 respectively, in the form of manually operated pedals positively connected to the respective brake rings 19, such as shown in Fig. 5.

A shuttle-like clutch operating unit 20 is disposed slidably on the jack-shaft between the members 14 and 15 and is operable to set the clutch part of either of said members by manual movement of a hand lever device 21 in a corresponding direction.

The operation of the motor 11 is regulated manually by a controller 22. Said controller, with the clutch control lever 21 and

brake pedals 17 and 18, are mounted on a platform 23 as shown in Fig. 1.

Current is supplied to the truck by a flexible cable 24, which is provided with a plug 25 to fit either of two sockets 26 on opposite sides of the truck. Said sockets are connected by cable 27 which is provided with a branch 28 leading to controller 22. A cable 29 extends from the controller to the motor. The cable 24 is of the automatic take-up variety, and the other end is carried by a spring or weight operated rotary drum, not shown but well understood in the art. This drum is preferably mounted in an elevated position, either at one end of the roadway 3 if not too long, or more usually near the middle of the length of the track, and acts like a spring curtain-roller. The plug and socket arrangement 24—25 permits of ready adjustment for operating the truck in either direction from the automatic take-up drum.

The slow-speed jack-shaft 13 has keyed thereon a pair of disks 30 constituting each a part of the clutches 14 and 15 respectively, of Fig. 5. Each disk 30 has a hub 31, and a bearing hole 32 is provided near the outer edge to receive cam 33. An expansible split friction ring 34 is disposed beside said disk and against the inner side of the drum 35 and is operated by said cam. Said ring is coturnable with disk 30 and shaft 13. The brake friction ring 19 is disposed loosely against the outside of said drum 35, except when contracted to set the brake. Said drum 35 is rotatable on the jack shaft 13, as will be explained.

The ring 34 is split at 34' and is sprung apart sufficiently to receive the pivotal operating cam 33. Said cam is rigid with one end of a crank arm 36. The other end of said arm 36 bears against the conoidal wedge member 20 and is forced outward thereby to expand and set the ring 34 against drum 35 when the member 20 is moved toward the corresponding member 14 or 15 by the manual member 21. The inwardly acting resilience of ring 34 tends to restore cam 33 and lever 21 to the release position. Hence the lever 21 is provided with latch or locking means, not shown, as will be understood. The member 20 has two conoidal faces 20' with an annular guide slot 20'' between, to receive the end of control lever 37. Said lever is pivoted to the truck at 38 and its other end is connected to the hand lever 21 by a link 39.

The brake ring 19 is made in halves hinged together at 40. The free ends are provided with perforated ears 41 to receive the rod 42, with a compression spring 43 interposed for automatically releasing the brake when the foot is removed from the pedal. The outer end of rod 42 has a stop pin 44 to hold the adjacent ear 41 from

slipping off. Secured to the outer side of the opposite ear 41 is a cam shoulder 45 concentric with rod 42, and on said rod is a similar cam shoulder 46 fixed thereon by pin 47. Said rod is operative rotatably by mechanism including in series crank arm 48, link 49, arm 50 (Fig. 6), shaft 51 and pedal crank arm 17 or 18. Said rod 42 is secured against lengthwise movement by shoulders 52 engaging the truck frame.

The clutch and brake member 14 is geared to the traction shaft 10, as will now be described. The clutch drum member 35 is provided with a supporting sleeve 53 which is rotatably mounted on the shaft 14 with a sleeve 53' interposed. A small gear 54 is keyed on the projecting end of said sleeve 53' for engagement with a large gear 55 fixed on the shaft 10. Said members 35 and 53 are connected integrally by a flange 35'. Said shaft 10 is made in two sections provided with a flexible coupling 56.

The other clutch and brake member, designated by numeral 15, is similarly constructed and is provided with a small bevel gear 57 rigid therewith, said gear 57 having a hub 58 keyed to sleeve 53'. Said gear 57 coacts with a larger bevel gear 59 which is rigid with the cable drum 16 whereon the draft cable 60 is wound for loading and unloading the transfer truck, by drawing the lumber-bunks on and off as will be more fully explained.

Referring now to Figs. 1 and 3, the power cable for drum 16 is provided with sheaves 61 at each end of the power truck. These sheaves 61 are arranged in pairs and are mounted to slide in their axial direction on supporting bars 62 which are parallel with drum 16. This slidable mounting permits the sheaves to travel sidewise, in accordance with the active part of the cable on drum 16. For convenience in describing the operation and use of cable 60 and the sheaves 61 the latter are designated individually by the letters *a*, *b*, *c* and *d*.

The operation for loading and unloading is as follows: Referring to Fig. 3, the transfer car is shown with a loaded lumber bunk 6 at one side on the rails 5, and the cable 60 extends from the upper side of drum 16 toward bunk 6 over sheave *c*, back over sheave *a*, and thence forward to the rear end of bunk 6, where the cable hook 63 is attached to the bunk frame. When the cable is wound up on drum 16 the bunk 6 is drawn upon the truck 1, as indicated by dotted line on Fig. 3.

In order to unload the truck 1 the cable 60 is carried from the top of drum 16 around sheave *c* and back to the rear end of bunk 6 where the hook 63 is attached to the rear end of the bunk frame. Then upon winding up the cable the bunk is drawn off from the truck. In loading and

unloading when the load has reached the desired position, the drum 16 is stopped instantly by depressing pedal 18. If the loaded bunk were to be drawn onto the truck from the left instead of the right of Fig. 3, the cable would extend from the top of drum 16 around sheave *c* and back to the rear end of the bunk frame. In unloading the truck to the left instead of from the right the cable 60 is extended from the top of drum 16 around sheave *c*, thence back around sheave *a*, and thence to the right end of the bunk, whereupon application of the power to wind up the cable removes the load to the left.

In case the truck 1 is to be used in a large plant it may be necessary, in order to provide for best efficiency, to install two transfer-ways T^1 and T^2 in spaced parallel relation with a cross transfer-way T^3 connecting same. In this instance the arrangement may be, for instance, as follows: On the right-hand side is a freight-yard or storage space where raw materials may be unloaded from trains and either stored or loaded onto the transfer truck. The material may then be advanced to one of the outside storage sheds, as for instance B or C containing side tracks 5. The space between the main transfer-ways may be occupied by a dry kiln D, into which the material may be transferred by use of the truck 1 and bunks 6. From the kiln D the material may be transferred to a factory or warehouse E, also by means of the truck 1 and bunks 6.

In order to support and guide power cable 24 at the corners of the main transfer-way and the cross transfer-way, sheaves 60' may be mounted with their axes disposed vertically at the corners to receive the cable. An extra set of wheels 64 are provided for supporting the truck 1 on the cross transfer-way T^3 , rails 65 (Fig. 10) being provided to receive said wheels. Said wheels 64 are mounted on vertically movable shafts or axles 66 and 67 respectively, which are mounted at the ends of the truck in parallel relation to the drum 16. Each axle 66 and 67 is swingingly supported on a pair of links 68, each of which is pivoted at one end, as at 69, to the truck frame, and the other end is provided with a perforation 70 to receive said axle.

Certain of the adjacent frame members 71 are provided with vertical slots 72 respectively, to accommodate the up and down movement of axles 66 and 67 respectively. Said links 68 and the axles carried thereby are movable up and down forcibly by cam and crank means now to be described. The crank arm 73 is fixed coturnably on a shaft 74 which is parallel with and spaced above axle 66. Said shaft 74 is provided with another crank arm 77 also fixed coturnably thereon. The free ends of the parallel arms

77 at the opposite ends of said truck respectively are connected by a rigid link 78, whereby their movements are synchronized whenever said mechanism is used.

5 In order to operate the above described mechanism power means, preferably adapted for operation by hand, are connected to said link 78. Said means preferably includes a screw 79 (Fig. 14) positioned nearly parallel with link 78 and provided with an operating wheel 80 fixed thereon, said screw being mounted in a threaded support 81. The forward end of said screw is connected by a swivel joint 82 and a stud 83 to said link 78. In order to increase the turning force applicable to wheel 80 the latter is provided with radial apertures adapted to receive hand spikes or leverage pins not shown, as will be understood. The support 81 is swung on a pivot 83 on the upper end of a stationary bracket 84 secured to one of the frame members 8.

The wheels 64 are connected to be driven by the same power source as wheels 9, and for this purpose gearing is connected to shaft 10, as will now be described. A beveled gear 101 is keyed on shaft 10, and a similar gear 102 is keyed on shaft 103 disposed at right angles to shaft 10. The axle shaft 66 and shaft 103 are operatively connected by a sprocket chain 104, which rides on sprocket wheels 105 and 106 keyed to said shafts respectively. The operation for transferring the weight of the car from wheels 9 to wheels 64 is as follows: The hand wheel 80 is turned clockwise as viewed from the left, thereby forcing link 78 to the right on Fig. 1. Referring to Fig. 9 it will be seen that this rotates the cam crank clockwise and forces the link 68 downward to the position shown in Fig. 10, where the wheel 64 is shown bearing on rail 65, and wheel 9 is raised clear of the rail 2. In order to restore the truck to its bearings on wheel 9 the operation is reversed.

It is to be noted that with the simple form of gearing and connections here shown the wheels 9 and 64 are at all times mechanically connected to shaft 10 but only one set of wheels is effective, namely the set which has bearing on its respective rails, the other set turning idly in the air.

Referring to Figs. 11 and 12, the modified construction and arrangement here shown illustrates how a truck embodying the main features above described may be employed in a side-piling system as distinguished from the end-piling system shown in Figs. 3, 4, and 7. In this modified embodiment the narrow transfer-way 114 is provided with a long narrow transfer truck 115, movable lengthwise thereon. Said truck 115 is provided with cross-rails arranged to register with the rails of the side tracks 116. These side tracks are adapted

to accommodate lumber bunks 117 disposed crosswise thereof, and parallel with the transfer-way 114, and the lumber 118 is likewise piled crosswise of the side tracks 116 and sidewise to the truck 115.

With this form of transfer truck the platform 119 is positioned at one end and the arrangement of the power equipment and electrical connections are correspondingly modified, as will be understood though not here shown in detail. This modified arrangement has the advantage that it is economical of space, as the transfer-way is narrow instead of broad, but on the other hand the end-piling system, while requiring more space for the transfer-way, is more convenient for access to any particular load or pile of lumber.

Although but two embodiments of this invention are herein shown and described it is to be understood that no attempt has been made to show all practical embodiments and that numerous details of the constructions shown and described may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

We claim:

1. A transfer truck having two sets of wheels arranged to travel on separate tracks respectively which are disposed at an angle, and means for adjusting the elevation of one of said sets of wheels relative to the car body, the said one set of wheels being mounted on vertically movable parallel axes, and links being provided for each of the movable axes, said links each having one end secured by a pivot which is stationary relative to the truck frame, and the other end being attached to the corresponding movable axis, and rotary lifting means arranged to coact between the movable ends of said links respectively and the frame of the truck.

2. In a transfer truck of the character described two pairs of wheels each pair mounted on respective shafts which are disposed in parallel relation and manually operative means connecting said shafts and arranged to synchronously raise and lower said shafts, said means including a common link, leverage means operatively connected to the ends thereof respectively, and a screw operatively connected to said link to force it longitudinally, whereby the end connections are caused to raise and lower said shafts simultaneously.

3. In a transfer truck, a pair of wheels, a shaft whereon said wheels are mounted, a pair of links each having one end pivoted to the frame of the truck and the opposite ends having the shaft swingable thereon, and means to raise and lower the free ends of said links, said means including a lever on a fixed fulcrum with one arm connected

to the corresponding link and the other having means to move it.

4. In a transfer truck, a pair of wheels, a shaft whereon said wheels are mounted, a pair of links each having one end pivoted to the frame of the truck and the opposite ends, having the shaft swingable thereon, and means to raise and lower the free ends of said links with said shaft, said means including a cam shaft parallel with the wheel shafts and having cams to engage said links respectively.

5. A transfer truck having a pair of supporting wheels, a shaft whereon said wheels are mounted, a pair of arms pivoted at one end to the truck frame and secured to said shaft at the opposite end, leverage means fulcrumed on the truck frame and operatively connected to the free ends of said links to raise and lower same, said leverage means having connected thereto a manually operated member adapted for movement forcibly to vary the relative elevation of said wheels and the truck frame.

6. A transfer truck having a pair of supporting wheels, a shaft whereon said wheels are mounted, a pair of arms pivoted at one end to the truck frame and secured to said shaft at the opposite end, leverage means fulcrumed on the truck frame and operatively connected to the free ends of said links to raise and lower same, said leverage means having connected thereto a man-

ually operated screw member adapted for movement forcibly to vary the relative elevation of said wheels and the truck frame, said screw member having radial apertures to receive a hand lever.

7. A transfer truck having two sets of supporting wheels which are alternately effective and which are disposed to carry the truck in two different directions respectively at an angle to each other, a motor, a shaft to which one or more of the wheels of each set are operatively connected permanently, and a clutch to connect said motor to said shaft.

8. A transfer truck having two sets of supporting wheels which are alternately effective and which are disposed to carry the truck in two different directions respectively at an angle to each other, means to raise and lower one set of wheels, a motor to move said truck on either set of wheels, depending on which set is lowermost, an axle shaft for one set being positively connected to an axle shaft of the other set, the connections therefor including a pair of bevel gears and a sprocket chain, and said motor being connected to one of said shafts.

Signed at Chicago this 14th day of Jan. 1922.

JULIUS KRAMER.
FRED O. KUEHNE, JR.
WALTER H. KOPPLIN.