(No Model.) 4 Sheets—Sheet 1.

D. E. JOHNSON.

TRACK LAYING APPARATUS.

No. 347,808. Patented Aug. 24, 1886.

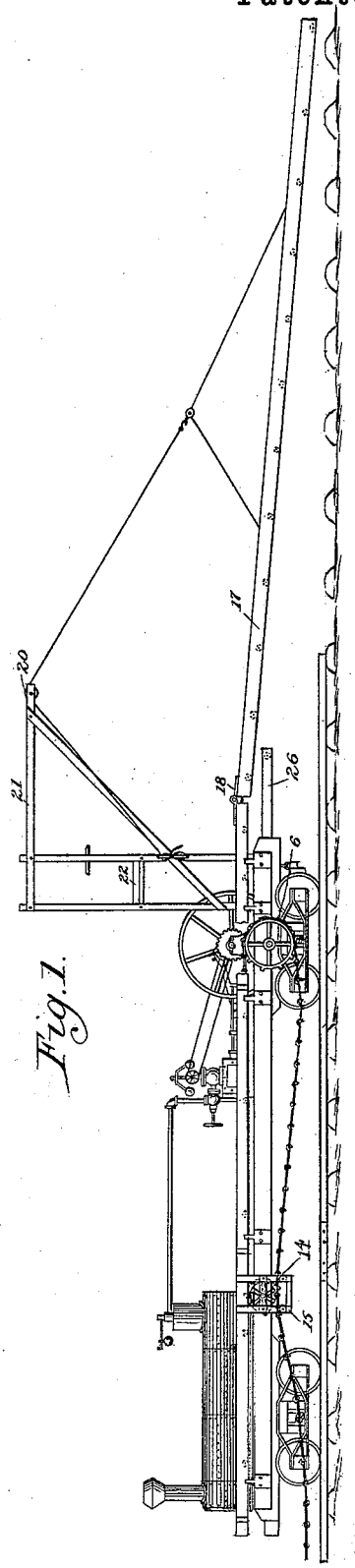

Fig. 1.

Witnesses
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D. E. JOHNSON.

TRACK LAYING APPARATUS.

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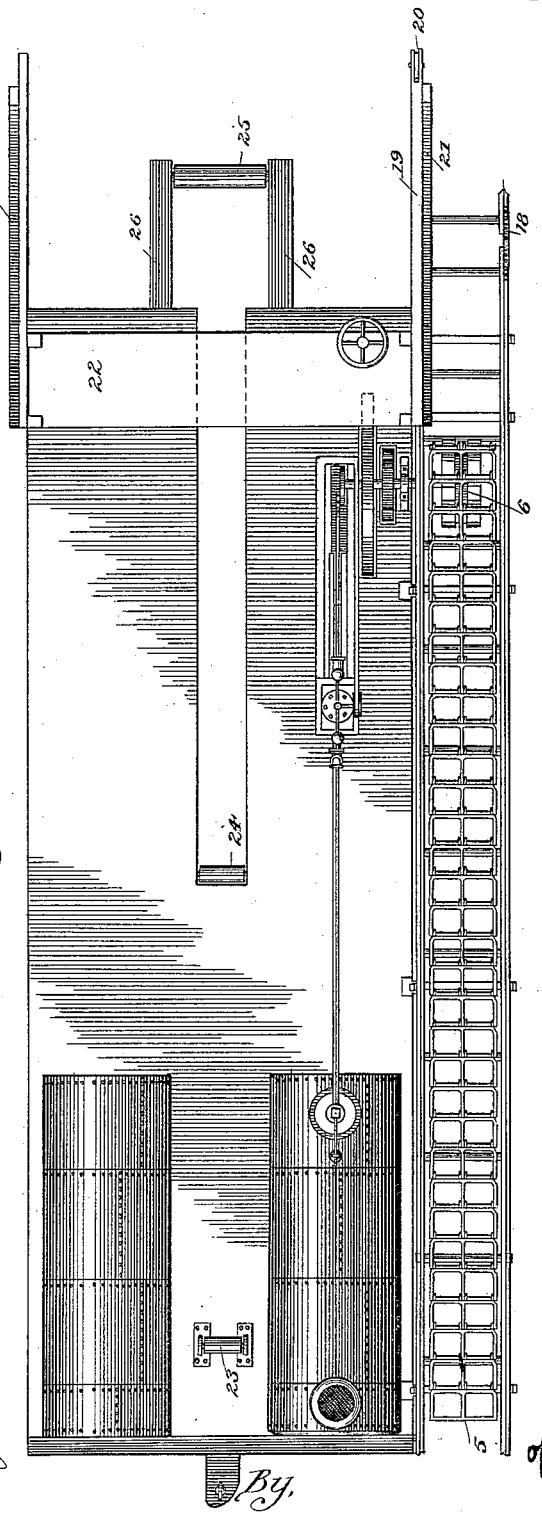

Fig. 2.

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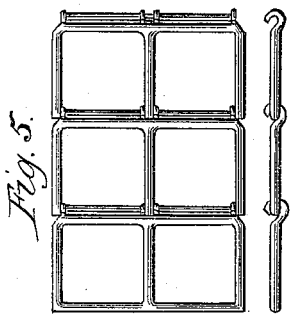

Fig. 5.

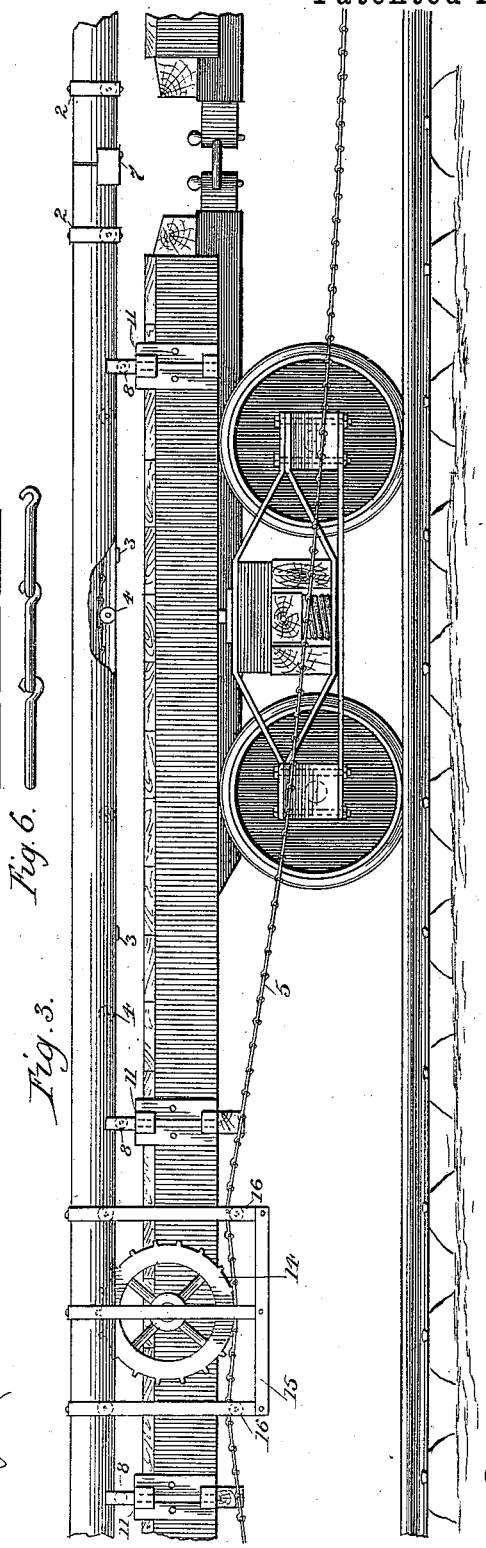

Fig. 6.

Fig. 3.

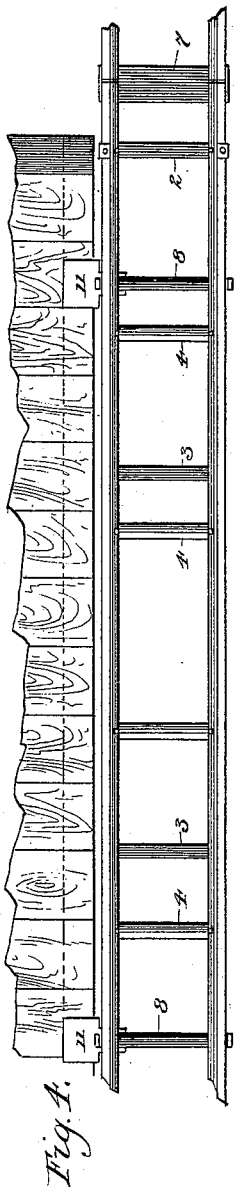

Fig. 4.

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(No Model.) 4 Sheets—Sheet 4.

D. E. JOHNSON.

TRACK LAYING APPARATUS.

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Fig. 7.

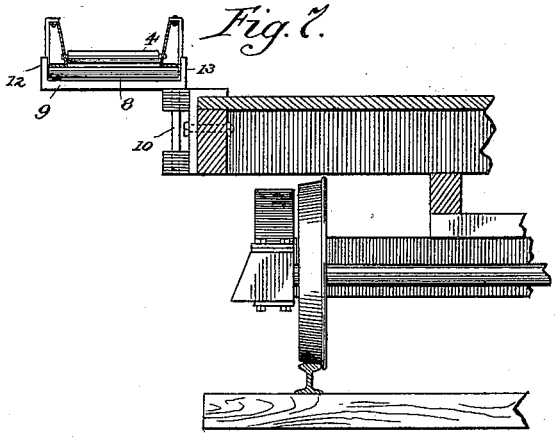


Fig. 8.

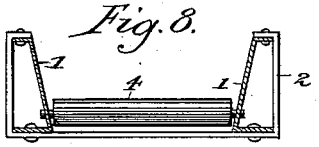


Fig. 9.

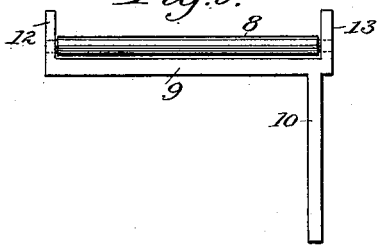


Fig. 10.

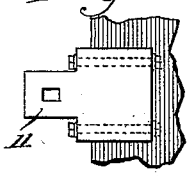


Fig. 11.

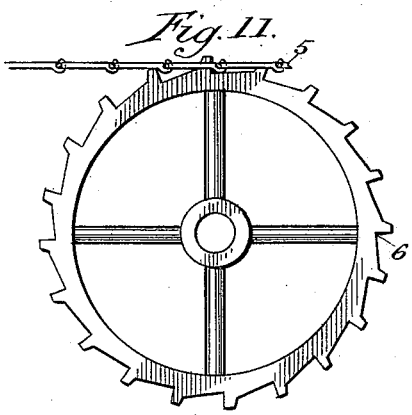
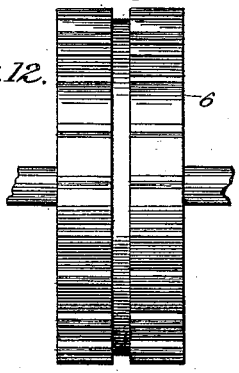


Fig. 12.



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UNITED STATES PATENT OFFICE.

DELBERT E. JOHNSON, OF DE KALB, ILLINOIS, ASSIGNOR OF ONE-HALF TO JAMES D. LOTT AND MARTIN DODGE, BOTH OF SAME PLACE.

TRACK-LAYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 347,808, dated August 24, 1886.

Application filed February 4, 1886. Serial No. 190,804. (No model.)

To all whom it may concern:

Be it known that I, DELBERT E. JOHNSON, a citizen of the United States, and residing at De Kalb, in the county of De Kalb and State of Illinois, have invented a new and useful Improvement in Track-Laying Apparatus, for which I desire to obtain Letters Patent of the United States, of which the following is a specification.

Formerly in laying railroad-track it was customary to carry the tie and rails to the front of the grade by the use of teams, and latterly the improved method has been introduced of making up a train which starts out with enough ties and steel for a half-day's work, as a rule, for the squad of men employed. On the forward part of the train—say, two or three cars next to the head or derrick car—are placed the rails and on the rear cars of the train the ties are loaded. As the work progresses the ties are run forward from the rear of the train to the front by being pushed along guideways provided with rollers by men detailed for that purpose. These guideways are made in sections of double rows of wooden timbers, between which rollers are placed near enough together to permit the ties to be thrown into the guideway and rest upon the rollers, the ties being pushed along on the rollers by the men using a pole with a prong similar to an ice-hook attached to it. A section of the guideway is fixed upon each car. As owing to the slack of the couplings between the cars there is a frequent change within certain limits of the length of the train, the sections of the guideway at their ends are frequently either jammed together or separated from each other. This results in considerable inconvenience in use, and, besides, in rapid destruction of the guideways, because of their knocking upon each other as the relative positions of the cars are changed. Moreover, this means of carrying the ties forward requires that a separate man should carry each tie from the rear of the train to the front, thus requiring him to lose a considerable amount of time in returning from the front of the train to the rear, or it is necessary that there should be a squad of men on the train sufficiently large that one man may take each tie from the man behind him and push it on, which necessitates a very large force. It should also be noticed as a disadvantage of the system in use that when any disconnection occurs between the successive sections of the guideway, as frequently is the case, it is necessary for the whole force of men engaged in carrying the ties forward to stop work while the dislocation is remedied, thus occasioning in practical operation a great loss of time.

I propose, in my present invention, to overcome these various difficulties and disadvantages, and to do away with a large percentage of the force of men required on the work by providing automatic steam-conveying apparatus for the ties, and the means which I adopt are, in general, as follows: I propose to make the conveyer automatic by the use of an endless chain, which shall pass from the rear of the train to the front around a steam-propelled sprocket-wheel at the front and back to the rear, passing over rollers appropriately fixed in a guideway, and of itself, without manual assistance, carrying the ties forward. In order to prevent the inconvenience and delay hitherto arising from the use of a guideway formed in separate sections, rigidly connected to the cars of the train, I propose to have my guideway made in a practically continuous form, extending from the front to the rear of the train, made up of sections, however, but such sections being so put together that when the apparatus is in operation the guideway is practically continuous throughout its length; and I further propose to mount the entire guideway upon rollers so that it shall have a slight endwise play with reference to the cars, instead of being rigidly attached to the cars, as has heretofore been the case, the guideway resting upon rollers fixed in brackets, which in turn rest in sockets attached to the cars. With respect to this branch of my invention I have elaborated various matters of detail, hereinafter fully described, and pointed out in the claims.

In laying track with machines of the general description which I have hereinbefore described, it has been usual to employ two squads of men for receiving from the forward end of the derrick-car and putting in place, respectively, the rails and the ties. It being desirable that neither of these squads should

wait for the other, it has been usual for the tie-laying squad to endeavor to keep a rail-length ahead of the rail-laying squad. In order to do this, it has been necessary for each tie to be carried from one to two rail-lengths from the car, and consequently for each man to walk from two to four rail-lengths for each tie which he places. This amount of travel of course necessitates the employment of a much larger squad of tie-layers than would be necessary if the ties were laid at or within a rail-length of the forward end of the train. Again, the two squads of men, taking the ties and the rails from the end of the train at the same time, interfere with and delay each other to a considerable extent. It has also been found that the delays incident to the method heretofore used of getting the ties ahead, and the accidents above referred to, to which it is frequently and continually subject, frequently result in an insufficient supply of ties, causing a delay to the whole work.

I propose to remedy these several difficulties and the delays by providing a point of delivery for the ties from one to two rail-lengths ahead of the forward end of the train by running out an extension of the guideway to such a point. The ties will then be delivered at the end of this extension one or two rail-lengths ahead of the derrick-car, while the iron squad will still take the rails immediately off of the derrick-car, so that the tie squad may maintain their advance of a rail-length or more, without traveling to and fro over that distance with the ties, and the two squads of men, taking their material, respectively, from different points of delivery, will not interfere with or delay each other. Moreover, the continuous automatic feed of ties delivered by my mechanism will keep the men always supplied and prevent delays incident to that cause.

In order to facilitate the movement of the ties from the front of the derrick-car to the end of the projecting section, I propose to have that section inclined. This will enable the ties to be readily pushed down the incline by hand, if necessary, but it will be observed that the natural action of my apparatus will be that the ties which are coming forward upon the endless chain in the main portion of the guideway will continuously push down the ties in the forward section, and thus the ties will automatically deliver themselves at the end of the latter. In order to permit any desired adjustment of the end of the forward section, I propose to attach that section to the derrick-car by means of hinges, so that it can be raised as high as desired or lowered by means of a derrick, and I also propose to provide a little lateral play in the hinges, so that the outer ends of the section may be swung laterally to enable it to avoid any obstacles which may be on the grade.

It should be observed that while that part of the guideway attached to the cars of the train is mounted so as to move slightly forward and back, it is essential that that part thereof which is attached to the derrick-car should be fixed fast, in order to resist the constant forward tendency of the rear portion of the guideway under the pull of the chain, while it is not essential that this part of the guideway should be mounted to move, since jamming of its end will be prevented by the fact that the rear part of the guideway being mounted on rollers, it will not be possible for the two to jam.

In track-laying machinery heretofore used, as above described, it has been usual to run the steel rails onto the derrick-car upon rollers placed on the top of the car, and the rails are taken off of the forward end of the car at such height as it may happen to be above the ground. It has been usual to select for this purpose as low a car as could be conveniently found, in order to bring the rail at its delivery within reach of the men; but even with a low car it has been found that the delivery was too high to be advantageous, the surface of the car being always from four to four and one-half feet above the ground, which places the rail altogether too high to be conveniently handled. I propose to modify the construction of the derrick-car with reference to this requirement by cutting out a slot in the forward part of the car and placing the rollers at a slight incline, so that the delivery of the rail may be made as near the ground as desired.

It has been heretofore usual to take the rails immediately off from the end of the car, and to run the derrick-car up for this purpose very near to the end of the last rail laid, in order to obviate useless labor in carrying the rail to its place. The derrick-car, being necessarily very heavy, will frequently, when run up to the end of the rail, cause the new-laid ties to sink in the grade slightly, so as to displace the end of the rail and make it very difficult to introduce the next rail between the angle-bars or fish-plates, which have as is usual in practice, been attached to the forward end of the last rail laid. Such a dislocation makes it necessary that the end of the rail should be pried back to its proper position, and this occurring frequently necessitates a larger force of men and considerable loss of time.

In order to obviate the necessity of running the derrick-car up to near the end of the last rail laid, and at the same time to dispense with any unnecessary carrying of the rail about to be laid, I propose to provide an extension from the forward part of the derrick-car. This extension will be from six to eight feet long and the rails delivered from a roller at the end of the extension, instead of from the car itself. It will then never be necessary to run the derrick-car nearer the end of the last rail than ten or twelve feet. It will of course be necessary to make the tie-delivering extension long enough to embrace the six or eight feet of this extension in addition to one or more rail-lengths.

In the drawings annexed hereto and forming a part of this specification, Figure 1 is a

side perspective of the derrick-car, showing the forward tie-delivering extension. Fig. 2 is a plan view of the derrick-car. Fig. 3 is a side view of parts of two cars of the train, showing my improved conveyer mounted thereon. Fig. 4 is a plan view of a portion of the guideway, showing it as attached to the car. Figs. 5 and 6 show a plan and side view, respectively, of the link belt or chain which I use. Fig. 7 is a cross-section of one side of the car and the guideway, showing the bracket by which the guideway is attached to the car. Fig. 8 is a section of the guideway, showing one of the braces attached to stiffen it, also one of the rollers. Fig. 9 shows the bracket by means of which the guideway is attached to the car. Fig. 10 represents the socket for the bracket shown in Fig. 9. Figs. 11 and 12 are faces and side views, respectively, of a sprocket-wheel used to propel the chain.

The guideway is formed in sections, each section consisting of two side pieces of angle-iron, 1 1, attached to each other at intervals by straps 2 2, one end of each strap being bolted or riveted to the top flange of one of the angle-irons, the strap being then passed down and under the two angle-irons, and its other end bolted or riveted to the top flange of the other angle-iron, the body of the strap being also bolted or riveted to the two bottom flanges of the angle-irons, respectively. The guideway thus formed is also stiffened by cross-pieces 3, bolted or riveted to the bottom flanges of the angle-irons at short intervals. The angle-irons are so placed that they converge toward each other downwardly, so that they form a trough-shaped guideway. They are provided near their bases at short intervals with sets of holes opposite to each other in the two pieces of angle-iron, to receive the journals of the rollers 4, upon which the chain 5 runs. This chain is of the general type known as detachable "link-belt" or "drive chain," made of a width to approximately cover the bottom of the guideway, and passes around the sprocket-wheel 6, fixed upon a shaft journaled in the derrick-car, and connected by appropriate gearing with the engine. The chain is endless, returning upon itself around another sprocket or idle wheel at the rear of the train, which it is unnecessary to show in the drawings. The various sections, each of about the length of a car, of the guideway are united to each other by means of a union-piece 7, in the shape of a two-angled bracket, which is bolted to and projects beyond the ends of one pair of the angle-pieces forming the guideway, so as to receive the adjoining ends of the angle-pieces forming the next section of the guideway, and prevents lateral displacement of the ends of the pieces of angle-iron with reference to each other. The entire guideway so made up is supported upon sets of rollers 8, Fig. 9, fixed in brackets 9, said brackets being provided with downwardly-projecting limbs 10, adapted to enter sockets 11, bolted to the car. The sides 12 and 13 of the brackets 9 project upwardly above the rollers 8 far enough to prevent lateral displacement of the guideway. The rollers 8 permit the guideway to move easily with reference to the car, to provide for the changes in the length of the train incident to the slack of the couplings, so that the guideway cannot be dislocated or injured by such changes. The section of the guideway attached to the derrick-car, however, is rigidly attached to the brackets 9, as otherwise the entire guideway would have a tendency to be pulled upon the sprocket-wheel by the chain. It will be observed that the pull of the chain upon the rollers will constantly tend to push all the sections of the guideway forward, and thus keep them in close conjunction at the points of connection and hold them firmly in the union-pieces 7, making lateral displacement of the sections at their ends most improbable.

In order to distribute the slack of the chain evenly between the front and rear ends of the train, instead of allowing it to accumulate at the front end, which would greatly increase the strain upon the chain and probably result in breaking it, I propose to provide the wheels over which the rear end of the chain passes with sprockets, and also to mount secondary sprocket-wheels at such intervals as may be found necessary between the front and rear sprocket-wheels. The use of a detachable link-chain has the great advantage that the length of the chain can be readily made to correspond to the length of the train, sections of the chain being taken out or inserted as cars are dropped from or added to the train. These wheels are shown at 14 in Figs. 1 and 3, and are mounted in a frame-work, 15, suspended from the guideway and provided with friction-rollers 16, for holding the return part of the chain against the face of the wheel. The upper teeth of the wheel taking into the chain as it moves forward in the guideway, the wheel is turned, and as it turns pulls along the lower part of the chain on its return path, distributing the slack evenly along the length of the train. The teeth of these wheels 14 should have their opposite sides alike, as shown, while the teeth of the drive-wheel 6 are preferably shaped as shown in Fig. 11. These wheels also serve the additional purpose of affording angular support for the chain when the train stands on a curve, the chain passing from one wheel to the next in a straight or nearly straight line. Where the apparatus is to be used for laying a track which has many sharp curves, more of these wheels will be required than when the track is to be comparatively straight.

The forward extension for delivering ties is shown at 17 in Fig. 1. It is preferably attached to that part of the guideway which is mounted upon the derrick-car by hinges 18 and 19, one hinge for each angle-iron, and its outer end is supported by a rope and tackle, running from a pulley, 20, mounted upon the derrick 21. Its position may be governed by hand, or, if desired, the tackle may be operated

from the steam-engine. The platform 22 on the derrick is that usually provided for the signal-man, who directs the engineer to move the train forward at the proper time.

The rollers used in running the rails forward upon the derrick-car and off from the derrick-car and in front of it to the ground are shown at 23 24 25 in Fig. 2. The roller 23 is journaled upon the top of a car, while the roller 24 is journaled a little below the top at the rear end of a slot cut back from the forward end, and the roller 25 is at a still lower level and is journaled between the projecting timbers 26 at a distance of six or eight feet from the forward end of the car. I propose to place these three rollers in the same plane, which will be, obviously, inclined to the top of the car. The rail will then be delivered from the car at an inclination, and can be taken by the men at that distance from the ground which is most convenient to them. As above explained, the advantage of placing the roller 25 a few feet in advance of the car obviates the necessity of bringing the weight of the car near to the end of the last rail laid.

The best arrangement of rollers for the guideway will probably be at distances of about three feet. It may be found that the rollers should be placed nearer together, or farther apart. The holes in the angle-irons to receive the journals of the rollers may be put nearer together, if desired, and then rollers be inserted at such distances as appear to be practically the best.

While it is, no doubt, best to place the propelling engine on the front end of the train, in order that the pull on the chain may be directly upon the upper part of the chain which carries the weight, it is still plain that the apparatus might be operated by an engine at the rear or center of the train, and under some circumstances it may be convenient to so employ it.

I wish it understood that I do not limit myself to the precise form or construction of any of the details shown herein, the gist of my invention lying in an automatic tie-delivery apparatus, however constructed, and a guideway mounted to move freely with reference to the cars.

I am aware that it has been proposed to use a carrier made of two parallel chains connected by cross-pieces, with a driving sprocket-wheel for each chain. This construction, which I do not claim, has the disadvantages of increasing the width of the guideway and of clumsiness, as compared with my belt driven by a single sprocket-wheel. My construction has the further advantage of placing the sprocket-wheel in the center of the guideway at intervals along the length of the chain, as hereinabove described, by which I am enabled to fix the chain, as regards lateral movement in the guideway, as often as it is desirable. The chain being made somewhat narrower than the guideway, a convenient amount of play is left between the chain and the sides of the guideway, to avoid interfering when the apparatus is used on curves.

I am also aware that it has been proposed to mount the guideway upon rings loosely fitting upon a round bracket. A construction of this kind would have little value in facilitating the movement of the guideway upon its support, since the rings would bind and turn heavily as soon as the weight of the ties was thrown upon the guideway. In my construction regular arbored rollers are employed, which reduces the friction between the guideway and the bracket to a minimum.

I am also aware that it has been proposed to use rollers for facilitating the delivery of the rails placed on an incline, in connection with a composite car, one end of which is constructed so as to roll upon the ground in advance of the track and the other end to ride upon the rails. Such a construction is obviously of doubtful utility, and is entirely different from that feature of my invention, which consists in mounting a delivery-roller upon an extension from the forward end of the derrick-car.

I claim—

1. The combination, with a train of cars, of a conveyer consisting of an endless chain extending along the train from the engine, a sprocket-wheel driven by the engine and giving motion to the chain, and one or more sprocket-wheels placed between the upper and lower halves of the chain for facilitating the movement of the chain and distributing the slack, substantially as described and shown.

2. The combination, with a train of cars, of a guideway extending from front to rear of said train, an endless chain, the upper half of which is supported in said guideway, an engine on a car of said train, a sprocket-wheel operated by said engine and driving said endless chain, and other idle sprocket-wheels placed between the two halves of the chain at intervals from the front to the rear of the train, whereby the slack of the chain is distributed, substantially as described and shown.

3. The combination, with a track-laying apparatus, of a derrick-car having a slot cut into its forward half, to permit the rails to be delivered from the car at a point below its top, substantially as described and shown.

4. In a track-laying apparatus, the combination, with a forward or derrick car of the train, of a set of rollers for running off the rails, said rollers being placed in a plane having an angle of inclination with the top of the car, and one of said rollers being mounted on beams projecting from the forward end of the car, substantially as described and shown.

5. In a track-laying apparatus, the combination, with the front or derrick car, said car being provided with a slot in its forward half, of a set of rollers arranged on an incline, one of said rollers being on an extension from the forward end of the car, substantially as described and shown.

6. In a track-laying apparatus, the combi-

nation of the forward or derrick car with a beam projecting from the front end of the same, provided with a roller at its end from which rails may be delivered, substantially as described and shown.

7. In a track-laying apparatus, the combination of a train of cars with a guideway for carrying forward ties, said guideway being composed of separate sections, each section being substantially of the length of a car and so mounted upon the car as to have a certain limited amount of movement with reference thereto, and the said sections being successively united to each other by union-pieces attached to said sections and telescoping about the ends of the adjoining sections, substantially as described and shown.

8. The guideway composed of the longitudinal angle-irons 1, united by braces and carrying between them rollers 4, journaled therein.

9. In a track-laying apparatus, the combination, with a train of cars carrying ties, of a tie-conveyer consisting of an endless detachable link-belt chain provided with supporting-rollers, an engine for giving motion to the same, and a set of single sprocket-wheels placed at intervals along the chain, substantially as described, and for the purpose set forth.

10. In a track-laying apparatus, the combination, with a train of cars carrying ties, of a tie-conveyer consisting of an endless belt-chain, said chain being made up of similar links of the width desired for the belt, united to each other by open hooks, a sprocket-wheel for giving motion to the chain, and an engine geared to the sprocket-wheel, substantially as described.

11. In a track-laying apparatus, the combination of a guideway with brackets for supporting the same, said brackets having rollers upon which the guideway rests, journaled upon substantially-horizontal axes in the upright portions of the brackets, substantially as described.

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