(No Model.) 5 Sheets—Sheet 1.

D. E. JOHNSON.

TRACK LAYING APPARATUS.

No. 354,146. Patented Dec. 14, 1886.

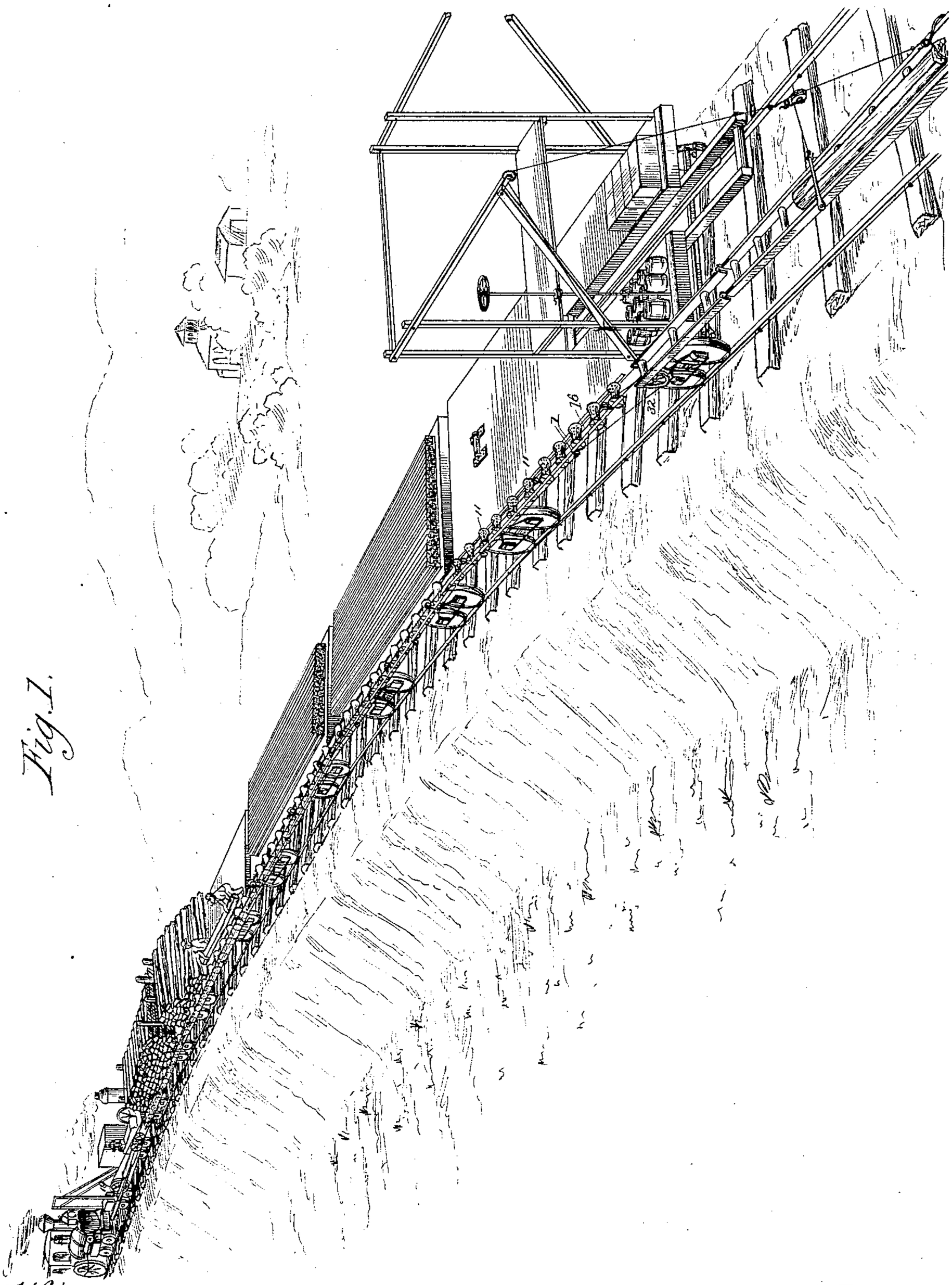

Fig. 1.

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D. E. JOHNSON.

TRACK LAYING APPARATUS.

No. 354,146. Patented Dec. 14, 1886.

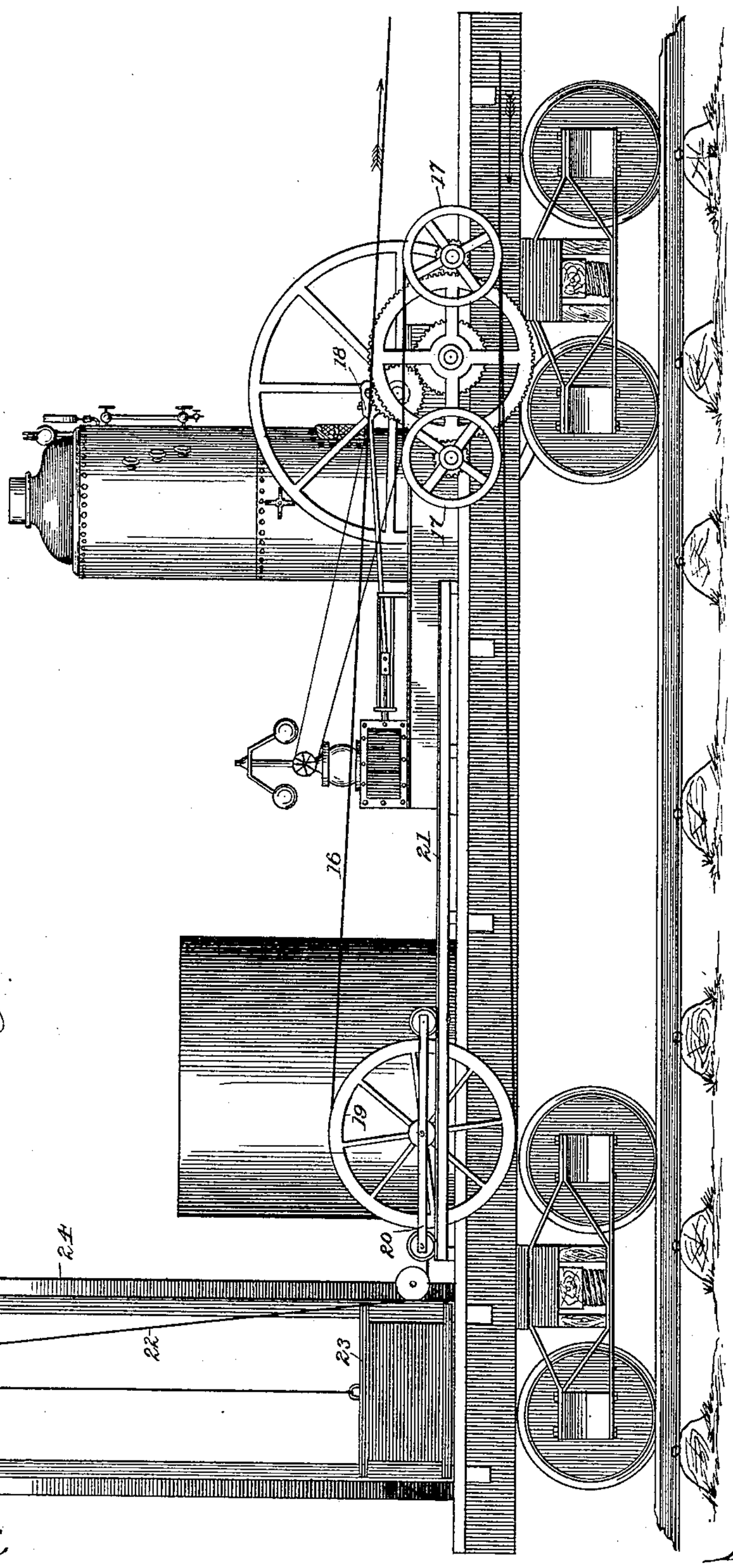

Fig. 2.

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(No Model.) 5 Sheets—Sheet 3.

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TRACK LAYING APPARATUS.

No. 354,146. Patented Dec. 14, 1886.

Fig. 3.

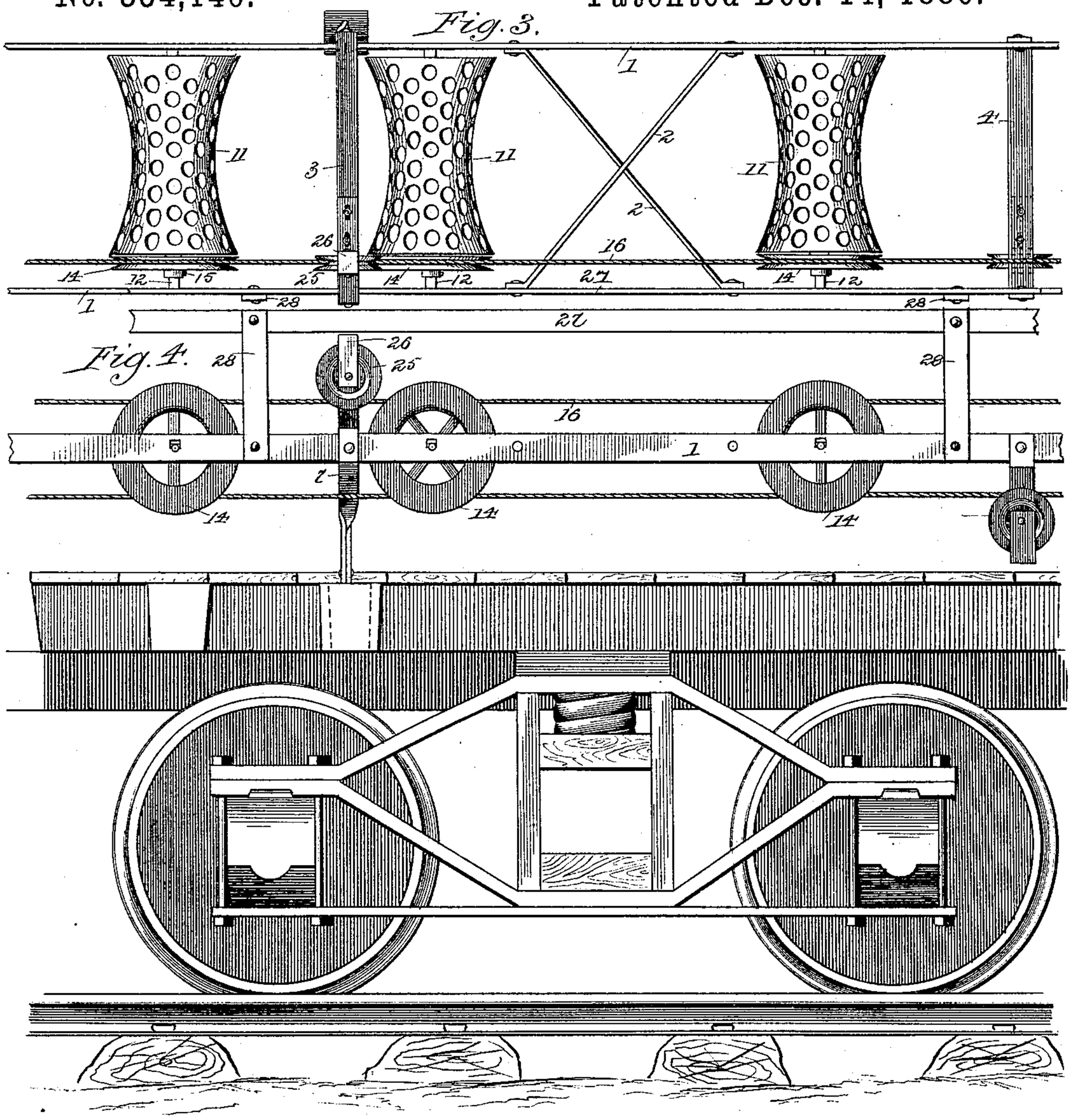
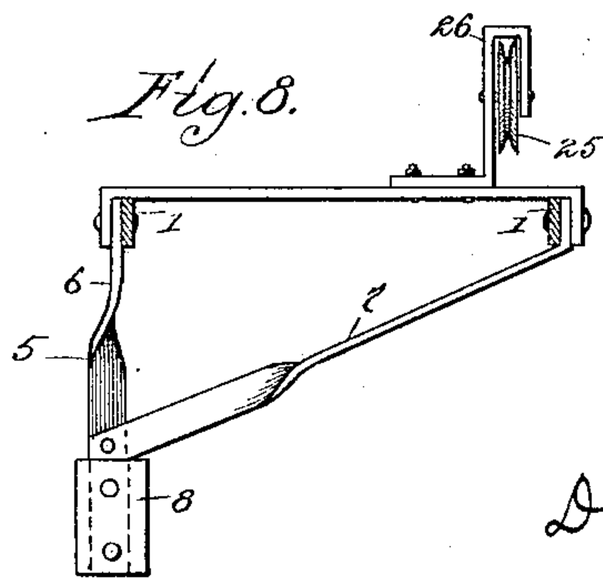


Fig. 8.



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TRACK LAYING APPARATUS.

No. 354,146. Patented Dec. 14, 1886.

Fig. 5.

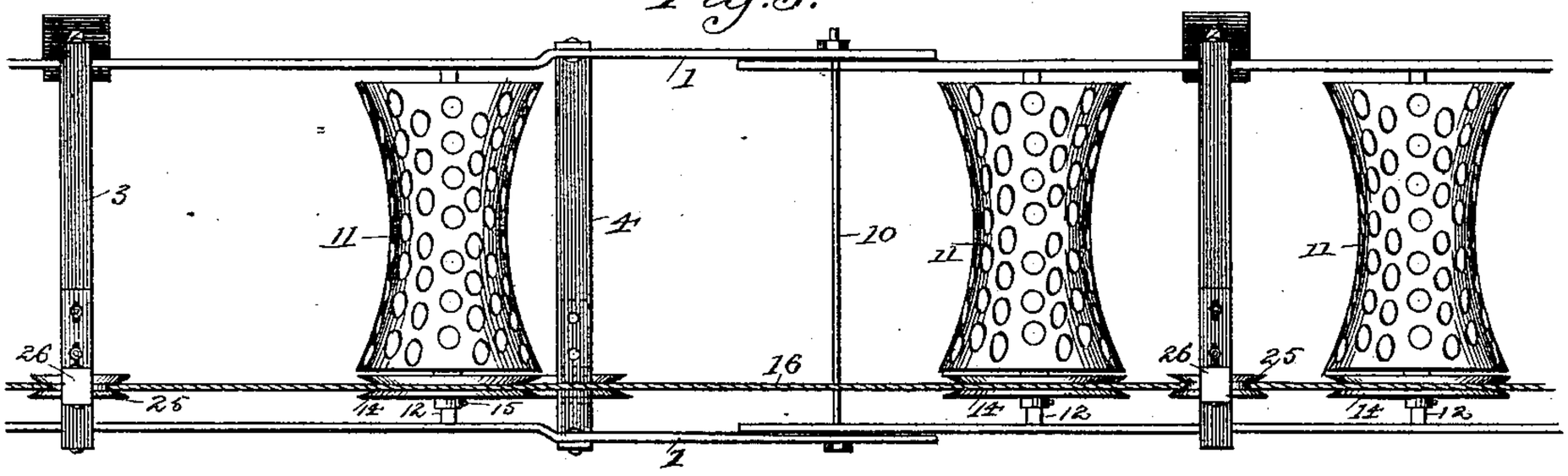


Fig. 6.

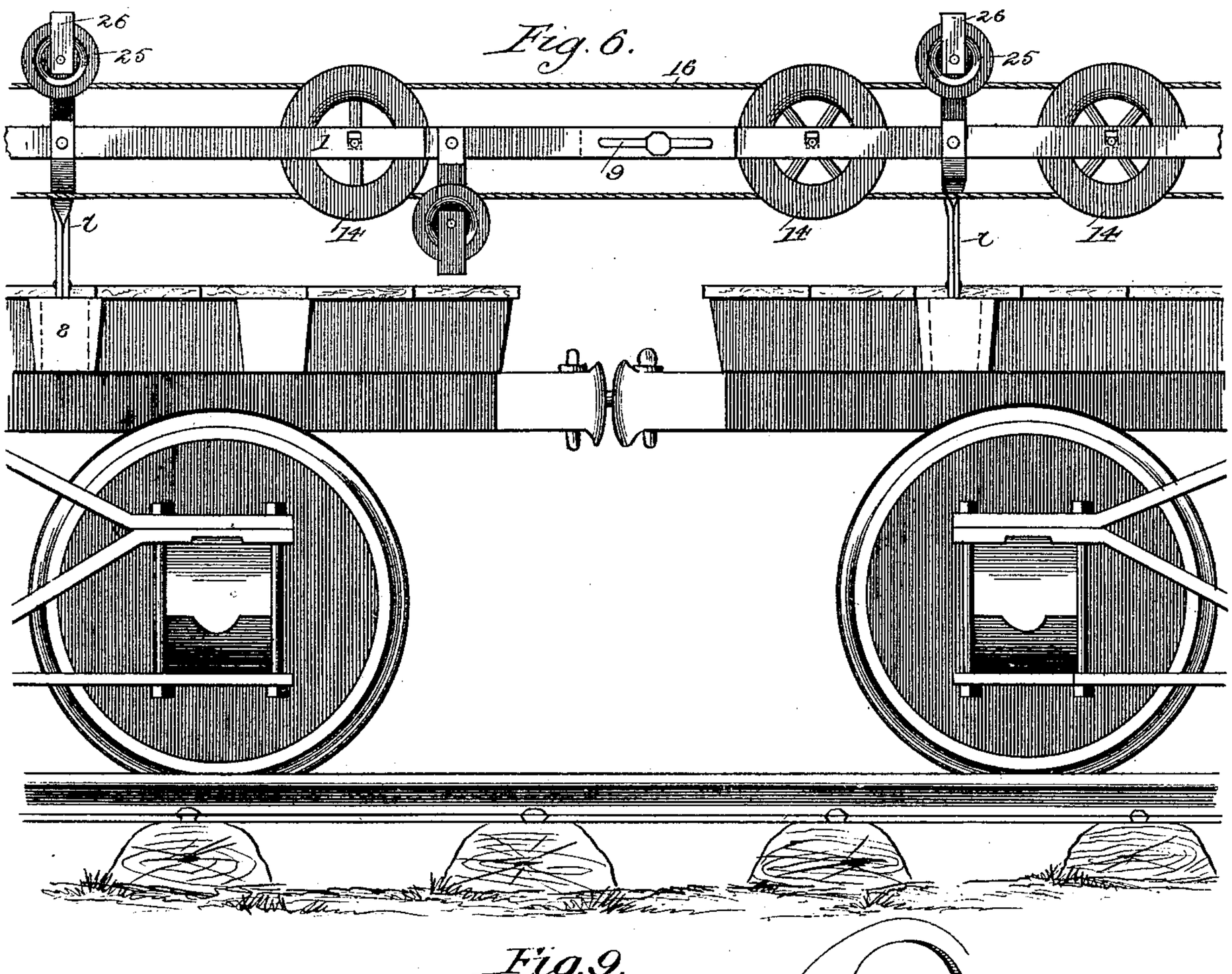
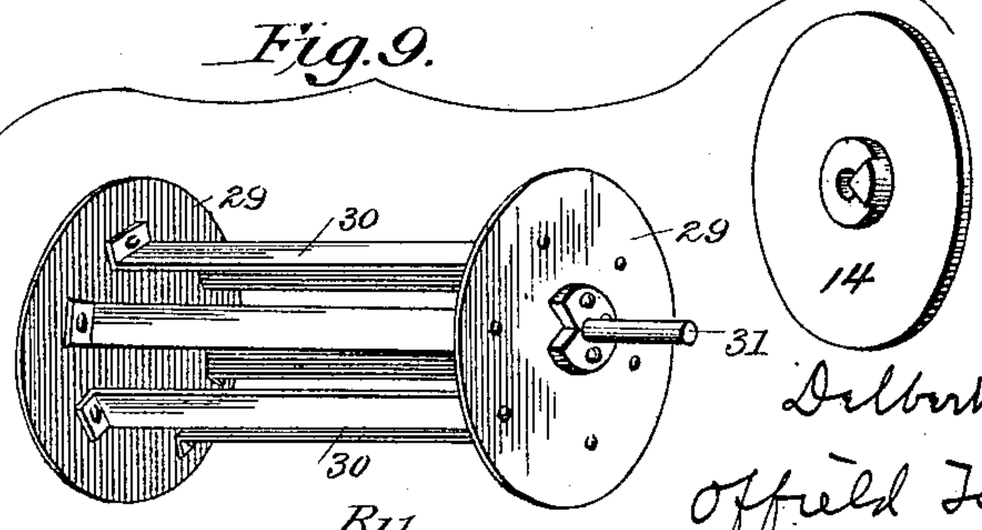


Fig. 9.



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(No Model.) 5 Sheets—Sheet 5

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TRACK LAYING APPARATUS.

No. 354,146. Patented Dec. 14, 1886.

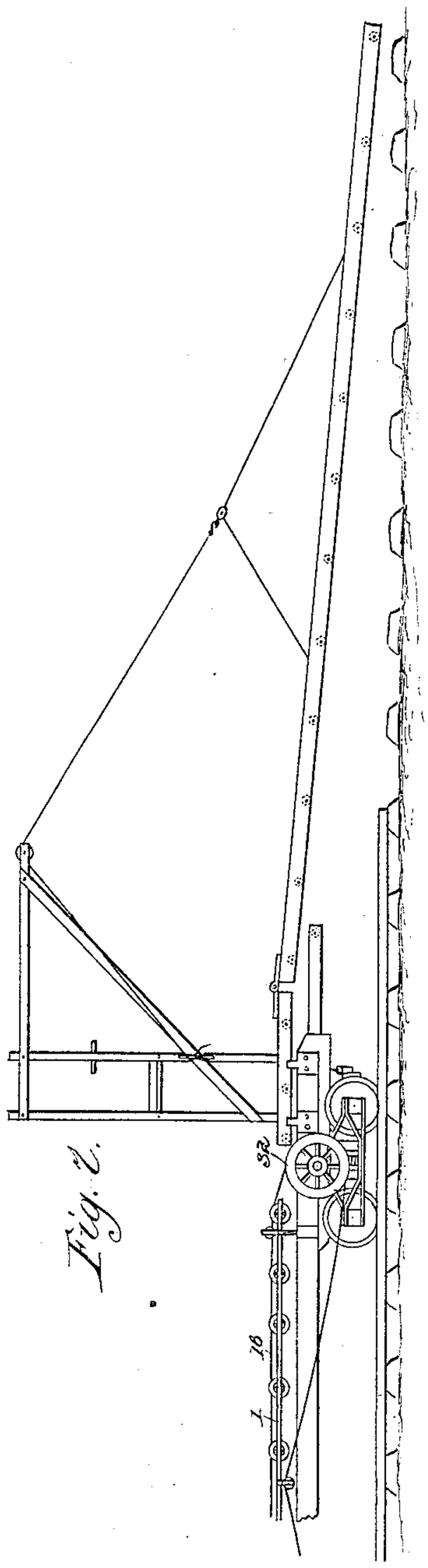

Fig. 2.

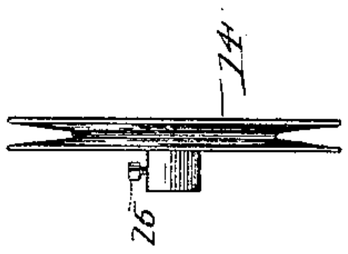

Fig. 12.

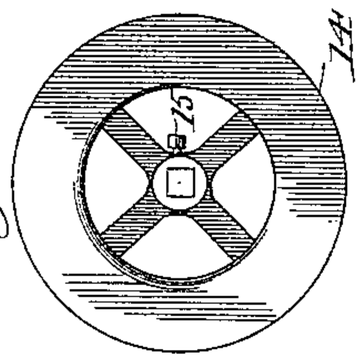

Fig. 11.

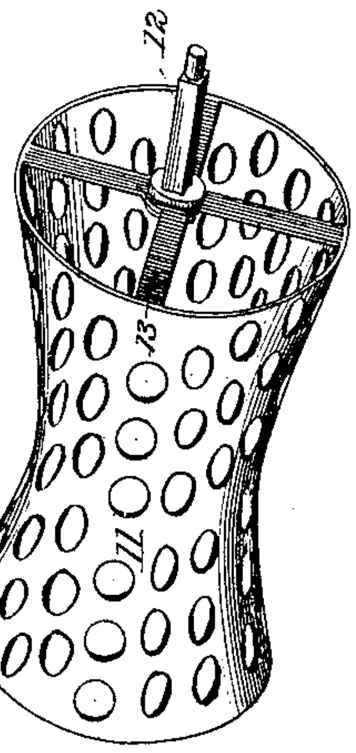

Fig. 10.

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UNITED STATES PATENT OFFICE.

DELBERT E. JOHNSON, OF CHICAGO, ILLINOIS.

TRACK-LAYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 354,146, dated December 14, 1886.

Application filed June 28, 1886. Serial No. 206,452. (No model.)

To all whom it may concern:

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

Hitherto track-laying apparatus of the class in which a train of cars is used to carry the ties and rails have been made with guideways in sections extending from end to end of the train, the guideways being constructed of double rows of wooden timbers carrying rollers between them, and placed at such a distance apart that the ties, when thrown into the guideways, would rest upon them and might be pushed along by men using poles with a prong similar to an ice-hook. 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, one of which is carried by each car, 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. Moreover, it is necessary with this apparatus that a man shall carry each tie from the rear of the train to the front, thus entailing a considerable loss of time while the men are returning from the front to the rear of the train, or that there should be a squad of men on the train sufficiently large to permit each man to take each tie from the man behind him and push it on, which requires a very large force. It is also a disadvantage of the system in use that when any disconnection occurs between the successive sections of the guideway, as is frequently the case, the whole force of men engaged in carrying the ties forward must stop work while the dislocation is remedied. Several different kinds of apparatus have been devised which have in part overcome the disadvantages of this system, consisting, in substance, in the provision of automatic apparatus—such as endless chains or a succession of belts—for giving a positive motion to the rollers journaled in the guideways.

In a previous application for Letters Patent, filed February 4, 1886, and numbered 190,184, I have myself shown an invention for overcoming these various difficulties and disadvantages, and doing away with a large part of the force of men required for the work; and my present invention has for its object to overcome the same difficulties and disadvantages in a different and superior manner.

The means which I propose to adopt are, in general, as follows: A guideway made in sections, one attached to each car, and of metal so framed as to be light and portable, is provided with rollers journaled in it at frequent intervals, and these rollers are caused to rotate automatically by steam-power through the agency of an endless cable driven by an engine mounted on a car of the train. The ties are automatically carried forward by the revolution of the rollers, and the larger portion of the force of men required to operate the apparatus above described is dispensed with. Sufficient friction between the cable and the rollers to insure the rotation of the latter is secured either by providing a V-shaped groove, in which the cable may rest, or by the use of auxiliary friction-rollers, made adjustable, for regulating the friction of the cable. Jamming of the ends of the sections of the guideway, of which one section is attached to each car, is avoided by a slotted telescoping connection of the ends, the result being that the sections can never come violently together nor be separated from each other by changes in the relative positions of the cars. Suitable and effective means are also provided for taking up the slack of the cable, as will be hereinafter described.

My invention consists, further, in certain features and details of construction, hereinafter pointed out and claimed.

In the drawings annexed, which form a part of this specification, Figure 1 is a perspective view, on a large scale, of my apparatus when in operation. Fig. 2 is a view of the engine and take-up. Fig. 3 is a plan view of a portion of the guideway; Fig. 4, a side view of the same and the car supporting it. Fig. 5 is a plan view of the guideway at a point of junction between adjoining sections. Fig. 6 is a side view of the same. Fig. 7 is a view on a small scale of the forward car of the train,

showing the derrick and an inclined-delivery section. Figs. 8, 9, 10, 11, and 12 are detail views of the various parts.

Each section of the guideway is formed of two parallel metal strips, 1 1, joined to each other at intervals by diagonal brace-rods 2 2, and by the perpendicular brace-rods 3 4, the brace-rods 3 passing above the longitudinal strips, and the brace-rods 4 below the same and alternating with each other. A suitable number of brackets, 5, are provided for supporting each section, and the two arms thereof, 6 and 7, are bolted or riveted, respectively, to the two parallel strips of the guideway. Upon the shank of the bracket is cast a block, 8, of such a shape as to fit the pockets usually provided on flat cars for stakes, or pockets or sockets, specially made for the purpose and attached to the cars. The side strips of each section at one of its ends are bent outward slightly, as shown in Fig. 5, so as to embrace the ends of the strips of the adjoining section, and all the strips are provided with slots 9, through which passes a rod, 10, serving to prevent detachment of the sections, while at the same time a sufficient play or relative movement between them is permitted by the slots. In these guideways are journaled rollers 11, made of sheet metal, perforated to reduce their weight, and supported on shafts 12 by radial arms 13. The shaft 12 is square, but provided at each end with a circular portion, which rotates in a corresponding circular hole cut in the side strip. To permit ready insertion and removal of the rollers, the holes in one of the strips are made square, of such a size as to receive the shafts, and are provided on their lower sides with curved recesses for receiving the ends of the shafts, as shown in Figs. 4 and 6. In placing the roller into the guideway one end of the shaft is pushed through this square hole to permit the insertion of its other end into the round hole in the opposite strip. The side strips may, however, be made sufficiently flexible to be sprung out, so as to receive the shaft without the expedient of the enlarged journal-hole.

Upon each roller-shaft is fixed a grooved wheel, 14, by means of a set-screw, 15, in its hub, this wheel receiving the endless cable 16, which passes from end to end of the train and takes several laps about the friction wheels 17, geared to the drive-shaft of the engine 18, as is usual in mechanisms of this character. From the friction-wheels the cable passes to a wheel, 19, mounted on a four-wheeled carriage, 20, traveling freely upon two guide-rails, 21, one of which is shown in Fig. 2, and connected by cable 22 with a counter-weight, 23, sliding vertically in frame 24. This counter-weight being properly adjusted to the length of the cable to maintain a proper degree of tension in it, serves to automatically compensate the effect upon the cable of any changes which may occur in the length of the train. I find that there is practically sufficient friction between the cables and the wheels 14, provided with a groove of the form shown, to maintain the rotation of the rollers and carry the ties forward. The friction is increased by the fact that the cable, being made up of a number of strands, has a polygonal contour, and, settling into the groove, obtains a sort of grip upon its sides as the cable twists, which it does to a slight degree (more or less) when in motion.

To hold the cable in the grooves and prevent its accidental dislodgment, I provide guide-rollers 25, journaled in bracket-arms 26, bolted to the upper cross-pieces, 3. All these cross-pieces are provided with holes for receiving the attaching-bolts of the bracket-arms, so that the guide-rollers 25 may be placed at as frequent intervals as is found convenient in practice. These rollers may also be used for the purpose of increasing the friction of the cable in the grooves, if that should be necessary, by shortening the upright part of brackets 26 sufficiently and causing the rollers to press down upon the cable. In fact, the entire friction requisite between the cable and the wheel 14 may be obtained by means of these rollers 25, the V-shaped groove being dispensed with and the face of the wheel 14 being made plain, or merely having flanges to keep the cable from slipping off. This adjustment may be conveniently made by the use of washers of different thicknesses between the bracket and the strip.

To prevent too great sagging of the lower half of the cable and to hold it in line when the train is on a curve, similar guide-rollers may be attached to the lower cross-pieces, 4, all of which are also provided with holes for receiving the attaching-bolts. The groove for receiving the cable may of course be made in the roller itself, or the wheel 14 may be made integral with the roller; but the construction shown is thought to be preferable, in order to permit the wheel to be replaced readily when the groove becomes too much worn to grip the rope. It will be observed, however, that, owing to the V-shaped form of the groove, it will continue to grip the rope until it is worn to its bottom. The rollers are given a smaller diameter at their centers than at their ends, in order to furnish a trough-shaped bottom for the reception of the ties; and to prevent possible slipping of the ties from the guideway when the train stands on a siding-track, I propose to attach to the outside strip of the guideway a rail, 27, by means of uprights 28, as shown in Figs. 3 and 4.

An alternative and equally serviceable form of roller is shown in Fig. 9, being made up of two head-pieces, 29, united by strips 30. In this modification I have provided the roller with an axle, 31, instead of a shaft, the axle being fixed rigidly in the guideway. This will no doubt be a more durable construction, since in the form previously shown all the friction being thrown upon the ends of the shaft they would speedily become worn out. When so made, a clutch is formed between the hub of the groove-wheel 14 and the hub

of the adjoining end piece, 29, of the roller, as indicated in Fig. 9, to cause the roller to move with the wheel, the latter being also journaled upon the axle. The roller of the construction shown in Fig. 10 may also of course, if desired, be mounted upon an axle, instead of upon a shaft. It should be observed that this construction, in which the axle is round throughout and has round holes provided for its ends in the guideway, is of practical advantage, in that it permits the ready removal and replacement of the rollers for purposes of repair in the field. The axle being made of such a size as to fit closely into the holes of the guideway, it is driven in and out, as required, the binding of the ends of the axle in the holes of the guideway being found practically sufficient to hold the axle in position when in use.

At the end of the train farthest from the engine the cable passes about the wheel 32 of sufficient size and strength to withstand the pull of the cable attached to the car. This car also carries the usual derrick and inclined hinged section used for running the ties down from the train to the track.

I do not confine myself to the V-shaped roller, as a U or other shape may be used, if desired.

An advantage of my construction to which I desire to call particular attention lies in the fact that the slot-connection between the ends of adjoining sections of guideway enables me to have a continuous guideway from one end of the train to the other, while at the same time each section of the guideway is fixedly attached to its car. Hitherto where the sections of guideway have been rigidly fixed upon the cars no connections between the adjoining ends have been attempted, and the disalignment of the sections when in use has been a serious practical difficulty and inconvenience. In order to permit the ends of the sections to be joined, it has been thought necessary to mount the sections so that they will be capable of a slight longitudinal movement with reference to the cars on which they are placed; but this expedient is costly and troublesome. My device combines the advantages of both the other mechanisms, while avoiding their objectionable features.

I wish it understood that I do not confine myself to the use of a detachable wheel for communicating the motion of the rope to the lower shaft, as it is obvious that the wheel might be made in one with the roller or fixed to the shaft, and that many other modified forms might be suggested which would not depart from the spirit of my invention. Likewise in respect to all the other details of my construction, I do not confine myself to the particular forms shown, but claim, broadly, all the equivalents thereof.

I am aware that heretofore it has been proposed to connect the two corresponding rails of a tramway-track laid upon the platforms of the cars of a train where the track passes from one car to another by the use of a bolt set in the end of one rail and passing through a slot formed in the end of the adjoining rail, the ends of the rails being formed so as to receive each other, that they may lap without interrupting the continuity of the track. This construction, therefore, I do not claim.

I claim—

1. In a track-laying apparatus, the combination, with a train of cars, of several sections of guideway, one end of each section receiving within it the end of the adjoining section, and both of said ends being slotted and provided with a bolt passing through said slots, substantially as and for the purpose set forth.

2. In a track-laying apparatus, the combination of a train of cars with a guideway made up of several sections, each of said sections being rigidly attached to a car of the train, and having one of its ends enlarged to receive the end of the adjoining section, substantially as and for the purpose set forth.

3. In a track-laying apparatus, the combination of a train of cars, an endless cable, a series of rollers mounted so as to rotate upon the cars of said train, an engine for giving motion to the cable in an endless path, and means for adjusting the friction between the rollers and the cable.

4. In a track-laying apparatus, the combination of an endless cable and a series of rollers, each of them provided with a detachable friction-wheel for receiving the cable, substantially as and for the purpose set forth.

5. In a track-laying apparatus, the combination of a train of cars, a series of rollers mounted upon the cars of said train, an endless cable, means for causing friction between the cable and the rollers, whereby the latter are rotated by the motion of the former, an engine and gearing for giving motion to the cable in an endless path, and a slack take-up for keeping the cable taut, substantially as set forth.

6. In a track-laying apparatus, the combination of a train of cars, a guideway mounted thereon and provided with rollers, an endless cable, an engine for giving rotary motion to said cable, and a wheel independent of the guideway and attached to one of the cars at the end of the cable farthest from the engine, for receiving the pull of the cable, substantially as and for the purpose set forth.

7. The combination of the cable, the grooved rollers, and the guide-wheels 25, substantially as and for the purpose set forth.

8. The combination of the cross-pieces 3 and 4, provided with holes, with the brackets 26 and guide-wheels 25, substantially as and for the purpose set forth.

9. In a track-laying apparatus, the combination of a train of cars, a series of rollers mounted upon the cars of said train, an endless cable, means for causing friction between the cable and the rollers, whereby the latter are rotated by the motion of the former, an engine and gearing for giving motion to the cable in an endless path, a wheel mounted upon

a carriage about which the endless cable passes, and a counter-weight attached to said carriage, substantially as and for the purpose set forth.

10. A guideway for a track-laying apparatus, composed of two longitudinal strips, 1, united by cross-pieces 3 4, placed alternately above and below the strips, said strips being provided with rollers mounted between them and adapted to rotate, substantially as and for the purpose set forth.

11. The bracket 5, provided with arms for receiving the guideway, and having cast upon it a block, 8, for fitting into pockets attached to the car, substantially as and for the purpose set forth.

12. In a track-laying apparatus, a guideway provided with a side rail, 27, attached to one of its side bars by uprights 28, substantially as and for the purpose set forth.

13. A roller for a track-laying apparatus, formed of two heads united by flat metal strips arranged in a circle about the axis of the roller, said strips being turned up at their ends and secured to the head-pieces, substantially as described.

14. In a track-laying apparatus, the combination, with a train of cars, of several sections of guideway, one end of each section receiving within it the end of the adjoining section, and the two ends being provided with a slot-and-bolt connection, whereby a limited amount of play is allowed between the two sections without the possibility of interrupting the continuity of the guideway, substantially as described.

15. In a track-laying apparatus, the combination, with a train of cars, of a guideway composed of a series of sections, each section being rigidly fixed to a car of the train, and one end of each pair of adjoining sections being sufficiently large to receive within it the end of the adjoining section and the adjoining ends, and being provided with a slot-and-bolt connection, substantially as and for the purpose set forth.

16. In a track-laying apparatus, the combination of a train of cars, an endless metallic cable, a guideway mounted upon the cars of said train, and a series of rollers journaled in said guideway and provided each with a V-shaped groove, said groove being of such a size that the cable when resting in it will impinge upon both of its faces, substantially as and for the purpose set forth.

17. In a track-laying apparatus, the combination of a train of cars, an endless cable, a guideway mounted on said cars, a series of rollers journaled in said guideway and provided with grooves, and a series of auxiliary rollers for regulating the friction between the cable and the rollers of the first series and retaining the cable in place in the said groove, substantially as described.

18. In a track-laying apparatus, the combination of a guideway with a series of rollers mounted in the same, each roller being provided with an axle fixed fast in the sides of the guideway, upon which it rotates, said axle being round throughout, and the sides of the guideway being provided with round holes for receiving the ends of the same, substantially as described.

19. In a track-laying apparatus, the combination of a guideway, a series of rollers mounted in said guideway, each roller being provided with an axle, upon which it rotates, said axle being set rigidly in the side pieces of the guideway, a friction-wheel also adapted to rotate upon said axle, and a clutch mechanism between the friction-wheel and the roller, whereby the motion of the former is communicated to the latter.

20. In a track-laying apparatus, the combination of a guideway, a series of rollers mounted in said guideway, each roller being provided with an axle, upon which it rotates, said axle being fixed fast in the sides of the guideway, a friction-wheel also adapted to rotate upon said axle, and means for connecting the friction-wheel with the roller, whereby the motion of the former may be communicated to the latter.

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