

H. M. LANE.
CABLE RAILWAY.

No. 342,368.

Patented May 25, 1886.

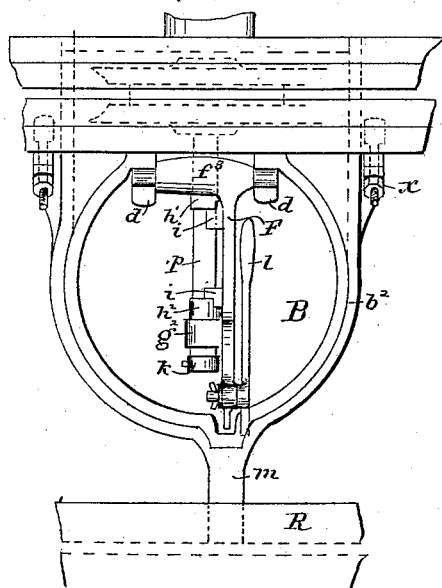


Fig. 3.

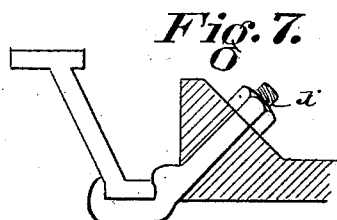


Fig. 7.

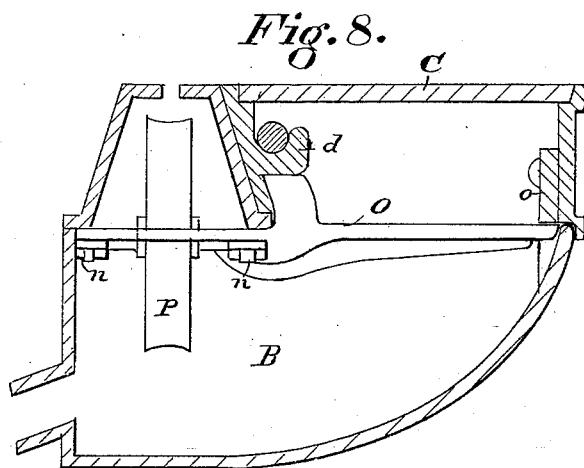


Fig. 8.

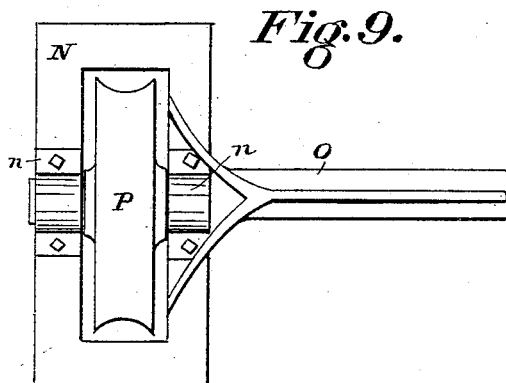


Fig. 9.

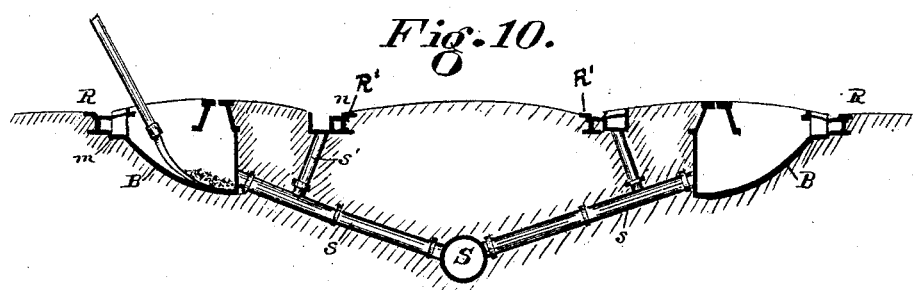


Fig. 10.

Attest:
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Henry M. Lane
By R. H. Horsey
Attorney.

(No Model.)

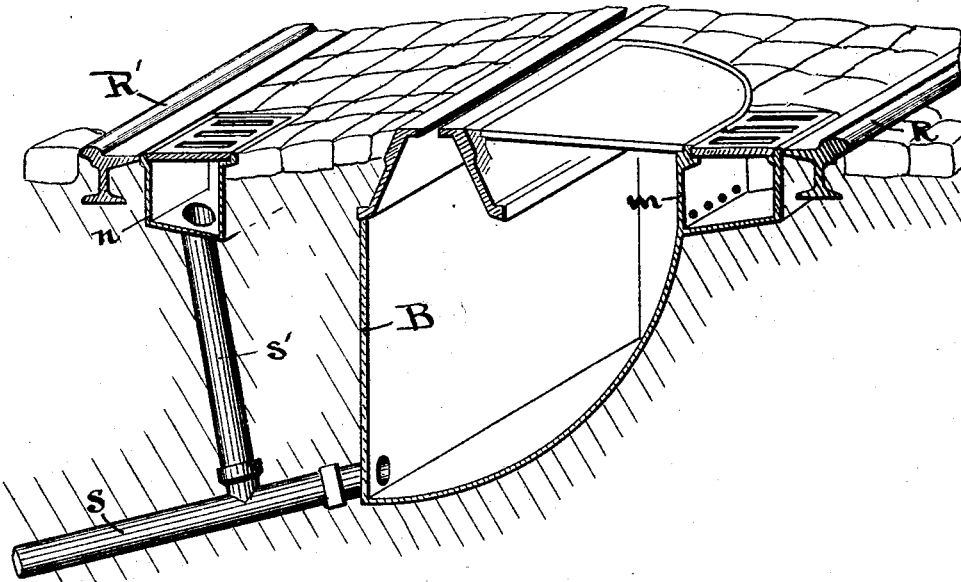
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Fig 11.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY M. LANE, OF NORWOOD, OHIO.

CABLE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 342,368, dated May 25, 1886.

Application filed January 3, 1885. Renewed January 16, 1886. Serial No. 188,807. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. LANE, a citizen of the United States, residing at Norwood, Hamilton county, Ohio, have invented new and useful Improvements in Cable Railways, of which the following is a specification.

My invention relates to improvements in the construction of cable railways employing as a motive power for cars a cable moving in a tunnel or cable-way beneath the surface of the roadway upon carrying-pulleys, its object being to economize the cost of construction and maintenance of such railways, and facilitate the operation, maintenance, and renewal of the carrying-pulleys, as hereinafter more fully set forth. The general cable-way or tunnel-casing of such railways is of only such dimensions as to enable the cable to be properly operated, and the carrying-pulleys are usually mounted in or adjacent to pits of sufficient size to permit an attendant to enter for the purpose of oiling the pulleys or making necessary repairs, the pulleys being so arranged in their bearings as to render it necessary to thrust the cable aside from its normal path or lift it from the pulley by a crowbar or similar instrument, which of course entails destructive wear.

My invention substitutes, for the enlarged pits and fixed pulleys, a casing of just sufficient size for the proper action and removal of the pulley, and a pulley and mounting mechanism arranged to permit free access and examination from the surface of the roadway, and the instant and entire removal or replacing of the pulley and its carrying mechanism without regard to the movement of, or inflicting injury upon, the cable. As an incidental feature of importance the casing also serves the purpose of a catch-basin or water-trap connected with the street-sewer, and may be used as a means of drainage for the trackway.

To these ends my invention consists, first, in a casing of a size approximately just sufficient to and adapted to contain the pulley and its mounting mechanism, located adjacent to and under the tunnel-casing, and arranged to permit the pulley to be held in place beneath the cable and dropped below and withdrawn without interfering therewith; secondly, in com-

bining with such or a suitable casing a carrying-pulley and mounting mechanism constructed and arranged to maintain the pulley under and support the cable, yet allow the pulley to be dropped below and withdrawn from the cable; thirdly, in the construction of the pulley and its carrying mechanism, whereby the same may be suspended in casings beneath the cable-way and adjacent thereto and be turned on pivotal bearings and removed through the top opening of the casing; fourthly, in the combined pulley-casing, pulley, and suspension apparatus, constructed and arranged to be secured to the tunnel-casing in complete and operative condition, or removed therefrom, without cutting or otherwise altering the tunnel-way or its parts; fifthly, in a construction and arrangement of the pulley-casing and sewer-connections whereby the casings may be used also as drainage-traps for the track road-bed; and, lastly, in certain minor details of construction more fully hereinafter pointed out.

Mechanism embodying my invention is illustrated in the accompanying drawings, in which Figure 1 is a vertical cross-section of the cable-way with pulley-casing attached, showing the pulley-carrying mechanism and the pulley in position beneath the cable; Fig. 2, a similar vertical cross-section, showing the same parts from the opposite side and the pulley swung out of the casing, as for inspection and oiling; Fig. 3, a plan view of the casing with the cover removed and the pulley in operative position, as in Fig. 1; Fig. 4, a rear sectional view of the casing, indicating its form in the longitudinal plane of the tunnel-way; Fig. 5, a perspective view of the pulley-carrying frame removed from the casing; Fig. 6, a detail view of one of the pulley-shaft bushings detached; Fig. 7, a detail view of one of the clamp-bolts used in securing the casing to the cable-way; Figs. 8 and 9, a vertical cross-section and partial plan, respectively, of a modified form of pulley-mounting mechanism; Fig. 10, a vertical cross-section of the entire roadway, showing the surface-drains and sewer-connections. Fig. 11 is a perspective view and cross-section of one of the casings, with its drainage chambers and connections.

The parts hereinafter referred to are designated in the drawings by letters of reference.

Referring now to the drawings, A denotes the cable way or tunnel formed by the two Z-irons a' a'' , with an opening or slit between their upper flanges of sufficient width for the passage of the grip mechanism of the cars; B, my improved pulley-casing, extending, as shown, beneath the cable-way and opening through the surface of the roadway adjacent to the cable-way by means of a removable cover, C.

I prefer to construct the casing B in two parts or sections, joined at a horizontal plane at about the lower level or bottom of the cable-way. These may be cheaply formed of iron castings of the general curved form shown in the drawings, the lower section being wider than the upper by just the width of the cable-way A, and the upper extended at the opposite side, either as a projecting tongue, m , or water-channel, formed to abut against and fit the contour of the track-rail R, and at the tunnel side to abut and rest against the Z-iron a'' of the cable-way. The two sections of the casing may be fastened together in any suitable manner by bolts or otherwise; but in general this is unnecessary, as the lower section is held and supported by the subjacent earth against the lower side of the cable-way and the upper section by its fit between the cable-way and the track-rail R. The two parts, however, may be secured together and to the Z-iron a'' by hooked clamping-bolts y , passed through exterior lugs, x , cast upon the sides of the upper section and embracing the lower beaded edge of the Z-iron, as indicated in Figs. 3 and 7.

From the lower section of the pulley-casing, at either side, as may be desired, I provide a sewer-connection, s , preferably arranged as hereinafter more fully described, for draining off any water that may find its way into the casing, and any sediment that may be deposited in the casing may be removed therefrom by the opening C without removing the pulley, as will be more clearly apparent later.

Upon the inner side of the upper section of the casing, adjacent to the cable-way, are attached two depending hooks or shaft-hangers, d , which carry the pivotal shaft f^3 of the pulley-carrying mechanism. Said carrying mechanism consists, mainly, of a frame, F, (shown detached in Fig. 5,) connected above at one end with a pivotal shaft, f^3 , by a web or bracket, f' , and extending horizontally at the opposite end into a projection, f^2 , as a guiding-tongue and pivotal support for a lever-catch, l , hereinafter described. At one side of the frame F is cast or formed two lugs, g' g'' , perforated in the same horizontal line, for the reception of the pulley-shaft p , which is preferably secured therein in the following manner: The perforations in the lugs g' g'' may be simply cored in casting, and are made large enough to admit collars or thimbles h , preferably of steel, which are turned true and fitted

to embrace the pulley-shaft and form the bearings therefor. The thimbles are inserted in the lugs from the extreme opposite sides, and are formed in length to abut against blocks i , cast upon the frame F, and are prevented from rotating by stops i' , adjacent to the abutments i , which stops engage with flattened surfaces or slots h' , formed in or upon the thimbles. The thimbles project beyond the lugs g in one direction, abutting against the hub of the pulley P, and in the other against the holding-collar k , secured by a set-screw upon and at the end of the pulley-shaft. This construction allows the entire removal of the pulley and shaft from its bearings by removing the collar k , when the thimbles may also be removed.

When the frame F is hung in the bearings d by its pivot-shaft f^3 , the pulley P overhangs the frame in the cable-way beneath the cable r , and the frame is held rigidly in this position by the tongue f^2 , resting upon the bottom of a shallow vertical guide-slot at the side b' of the upper casing-section, and locked by a bell-crank lever, l , pivotally secured to the tongue f^2 , and having a catch-hook end, l' , engaging in a suitable recess formed in the casing and against the lower edge of the upper section of the casing. In this position the handle l of the bell-crank is maintained horizontally, and is accessible upon raising the cover C. As a further means of secure holding, an arm or stop, e , may be formed to project downward from the under side of the cover and rest upon the arm l ; but this is not essential. It will now be sufficiently obvious that upon removing the cover C and releasing the catch l' , the carrying-frame and pulley may be swung upward into or approximately into the position indicated in Fig. 2, without detaching any part, and may be oiled, adjusted, or a new pulley and shaft or new bearing-bushings inserted with great facility; or the parts may be lifted bodily from the hangers d and removed. In removing or replacing the pulley its cable-engaging periphery follows, in the pivotal movement of the suspending-frame, the arcs indicated by dotted lines, Fig. 2, and as it drops below the normal line of the cable, the latter "sags" down slightly and remains suspended between and upon the adjacent line-pulleys, ready for re-engagement by the pulley P, when replaced and moved upward in the path indicated by the dotted lines.

In the modified structure shown in Figs. 8 and 9, the bearing-frame of the pulley is pivotally suspended in the same manner, in hangers d , but is extended below into a horizontal frame, V, surrounding the pulley P, having a bearing for the latter at both sides in ordinary journal-blocks with caps n . The frame is extended laterally into an arm, o , engaging at its extreme end with the casing beneath a pivoted latch-block, o' . All other constructive features remain the same. The pivoted latch-block o' may be substituted for the bell-crank latch l in the first-described construc-

tion, if preferred, and the hangers *d*, instead of being formed upon the inside of the casing, may be attached directly to the side of the Z-iron *a*², and such side of the casing omitted.

5 In connection with the main function of the casings thus described, it remains to indicate more fully their usefulness as catch-basins for drainage.

The preferred arrangement is as indicated 10 in Figs. 10 and 11, showing the casing B at opposite sides of the roadway connected by drain-pipes *s* *s*, to the sewer-main S. The extended necks *m* of the casings, as already indicated, may be formed as water-channels, 15 and may be provided with openings adjacent to the track-rails R, having suitable gratings. The mouth of the sewer-pipe *s*, opening into the casing B, is elevated above the bottom of the casing sufficiently to permit the solid 20 matters carried in by water to settle, whence they may be removed by a suitably-formed scoop, *u*, inserted through the main opening C, after the pulley and its carrying mechanism have been swung into the position indicated 25 in Fig. 2. Supplemental catch-basins, *n*, may be provided at the opposite rail, R', with gratings and a pipe-connection, *s'*, leading into the connections *s* or sewer S. By this arrangement the depressions of the track-rails are con- 30 stituted water-ways, conducting the surface water into the casing B, and thence into the sewer, thus insuring a dry roadway.

The lower section of the casings may, if preferred, be made of tiling, burned clay, or cement; but I prefer to make the same of cast- 35 iron, preserved from rusting by paint or pitching, such as employed in ordinary water-mains.

The precise nature and relative advantages 40 of my improvements will perhaps appear more clearly in connection with a brief consideration of some of the ends desirable to be attained in cable railways generally, and are as follows:

First. The rapid rotation of small carrying- 45 pulleys under a cable driven six to eight miles per hour, as is customary, involves the danger of heating the journal-bearings and a rapid and destructive wear, besides necessitating increased power in the cable to overcome the 50 greater friction; hence it is desirable to use pulleys of a diameter not less than fourteen to twenty-four inches.

Second. In the use of a flat or slotted cable it is desirable that the same should be carried 55 sufficiently close to the under side of the slot-rails forming the cable-way to prevent the cable from slipping around on edge, or otherwise slipping out of its proper bearings in the grooved periphery of the pulley. The pulley 60 should therefore be so located, when possible, that while side flanges are sufficiently free from contact with the under side of the slot-rails there shall not be room enough between said rails and said flanges to permit the cable 65 to slip off the pulley. The same conditions are applicable in a degree to a single-cable mechanism.

Third. It is of importance that sufficient space be allowed beneath the pulley to avoid interference in their action by accumulation 70 of dirt.

Fourth. With small cable-ways it is particularly desirable to provide special receptacles for the pulleys, thus obviating any increase in the size of the cable-way in afford- 75 ing ample room for pulleys of a sufficiently large diameter.

Fifth. It is always important that the cable-way or tunnel-rails should not be cut or divided, but should remain continuous and un- 80 broken.

It will be observed that my invention answers all of the above-stated desiderata, besides introducing additional features of convenience and adaptability to the ends in view, 85 which reduce the cost of construction and maintenance materially.

I claim as my invention, and desire to secure by Letters Patent of the United States—

1. In combination with the cable way or tunnel of a grip cable railway, a pulley-casing arranged beneath and extended laterally to include an access-opening immediately adjacent to the tunnel and provided with a cable-carrying pulley and bearing mechanism, said casing being constructed of a size and form ap- 90 proximately just sufficient to contain the pulley and permit the same to be moved laterally into an accessible position beneath or removed through the access-opening, substantially as set 100 forth.

2. In a grip cable railway, a pulley-casing constructed in two sections divided horizontally, the upper section being adapted to fit upon and be maintained between the cable-way and contiguous track-rail and provided 105 with an access-opening and removable cover adjacent to the casing, and the lower section being extended laterally beneath the cable-way to inclose the pulley, substantially as set 110 forth.

3. In a grip cable railway, a pulley-casing constructed in two sections divided in a horizontal plane, the upper section being secured adjacent to the cable-way and provided with bearings for the maintenance and operation of the carrying-pulley and a surface access-opening removably covered, and the lower section extended beneath the cable-way and provided with a sewer-connection, constituting it also 120 a drainage-trap, substantially as set forth.

4. In combination with a suitably-formed casing, a cable-carrying pulley journaled in a bearing-frame arranged to permit the pulley to be dropped below the cable and moved laterally into a position affording access from an opening at the side of the cable-way or wholly removed from said casing through said opening, and, conversely, to be similarly replaced in relation to the cable without interfering 125 with the movement of the latter, substantially as set forth.

5. In a grip cable railway, in combination with a casing arranged below the cable-tunnel

and opening through the roadway at the side of said tunnel, a cable-carrying pulley arranged in a pivotally-suspended frame, permitting the pulley to be swung below and away from the cable, and, similarly, to be swung back into position to take up the cable upon its periphery, substantially as set forth.

6. In a grip cable railway, in combination with a casing arranged beneath and extended laterally to include an access-opening at the side of the cable-way, a carrying-pulley mounted in a supporting-frame hung in pivotal bearings at the side of the cable-way, said casing being adapted to permit a pivotal movement of the pulley and carrying-frame in a vertical plane below and away from the cable into an inverted position under or through said access-opening, substantially as set forth.

7. A combined pulley-casing, pulley, and pulley-bearing mechanism, said casing being adapted to be secured beneath and at the side of the cable-way irons and opening through the roadway at the side of the cable-way, provided with a removable cover constituting part of the roadway, and said pulley and bearing mechanism being secured in the casing and adapted to permit the withdrawal or replacing of the pulley through the access-opening of the casing, the whole adapted to be constructed and placed in complete and operative condition in position ready for immediate operation, substantially as set forth.

8. In a grip cable railway, a pulley-casing arranged beneath and adjacent to the cable-way adapted to permit the withdrawal of the pulley through an access-opening at the side of the cable-way, and a sewer-connection entering above the bottom of the casing, whereby the casing is also made a catch-basin for surface-drainage, from which the collected sediment may be removed through said access-opening upon withdrawing the pulley, substantially as set forth.

9. In a grip cable railway, a pulley-casing adapted to contain and permit the removal and replacing of the pulley through an access-opening at the side of the cable-tunnel, said casing being laterally extended to the contiguous track-rail and there provided with a supplemental drainage opening and grating and provided below with a sewer-connection, substantially as set forth.

10. In combination with the carrying-pulley of a grip cable railway, the pivotal frame F, provided with bearings for the pulley-shaft, substantially as set forth.

11. In combination with the pivotal pulley-frame F, the catch-lever *l*, substantially as and for the purpose set forth.

12. The casing B, provided with the bearings *d* and the ledge or abutment *b*², in combination with the pivotal frame F and locking-lever *l*, substantially as and for the purpose set forth.

13. The pulley-frame F, provided with perforated lugs *g'* *g*², in combination with the pulley, pulley-shaft, and the removable thimbles *h*, substantially as and for the purpose set forth.

14. The pulley-frame F, constructed with bearing-lugs *g'* *g*² and abutments *i* *i*, in combination with thimbles *h* *h*, the pulley, pulley-shaft, and the collar *k*, substantially as and for the purpose set forth.

15. In a grip cable railway, the combination of the pulley-casing B, provided with the drainage-extension *m* and sewer-connection *s*, with the supplemental catch-basin *n* and pipe-connection *s'*, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY M. LANE.

Witnesses:

L. M. HOSEA,
CARROLL B. CARR.