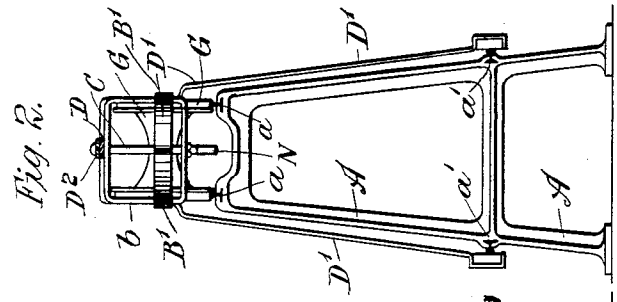
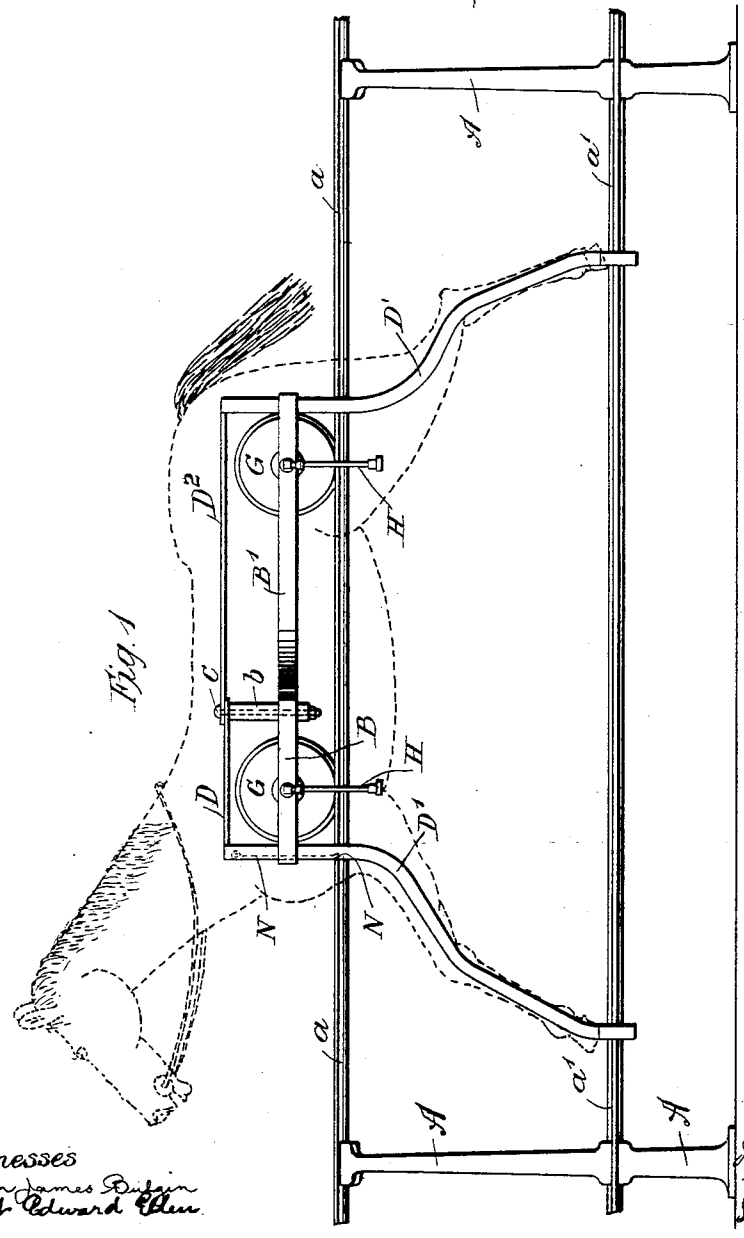
(No Model.) 3 Sheets—Sheet 1.

J. W. CAWDERY.

CARRIAGE FOR GRAVITY RAILWAYS.

No. 593,413. Patented Nov. 9, 1897.





Witnesses
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John William Cawdery
By his Attorney
George Henry Rayner

(No Model.) 3 Sheets—Sheet 2.

J. W. CAWDERY.

CARRIAGE FOR GRAVITY RAILWAYS.

No. 593,413. Patented Nov. 9, 1897.

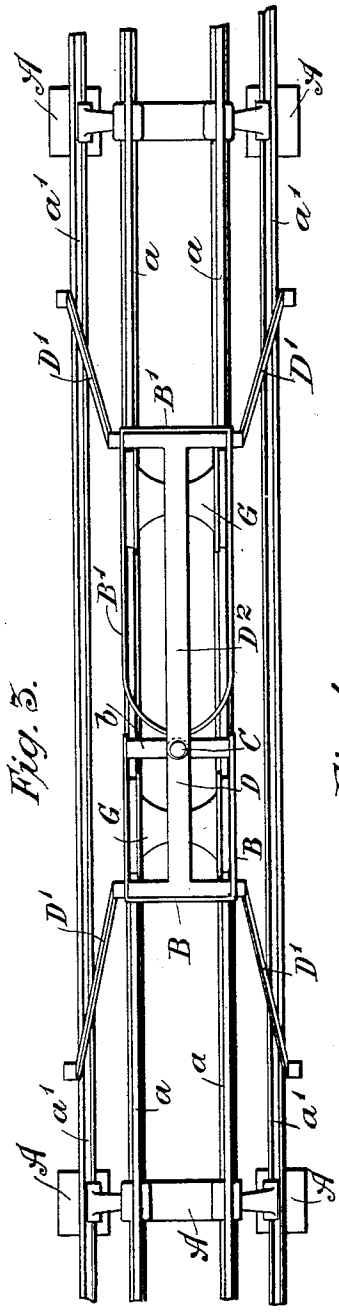

Fig. 5.

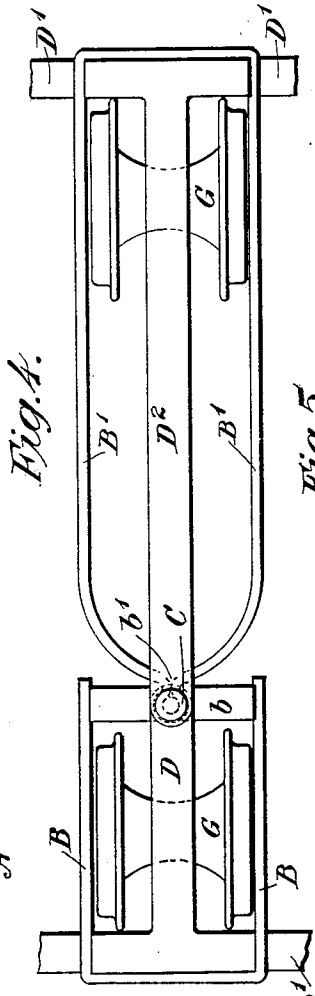

Fig. 4.

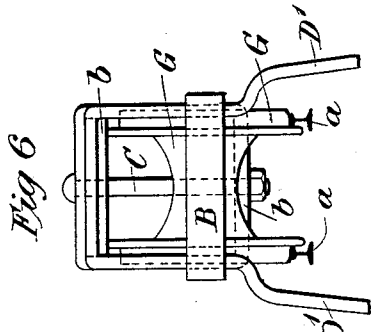

Fig 6

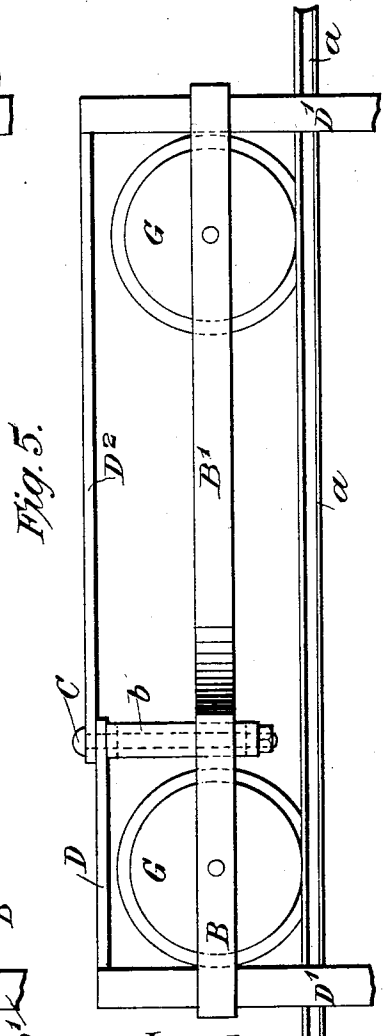

Fig. 5.

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(No Model.) 3 Sheets—Sheet 3.

J. W. CAWDERY.

CARRIAGE FOR GRAVITY RAILWAYS.

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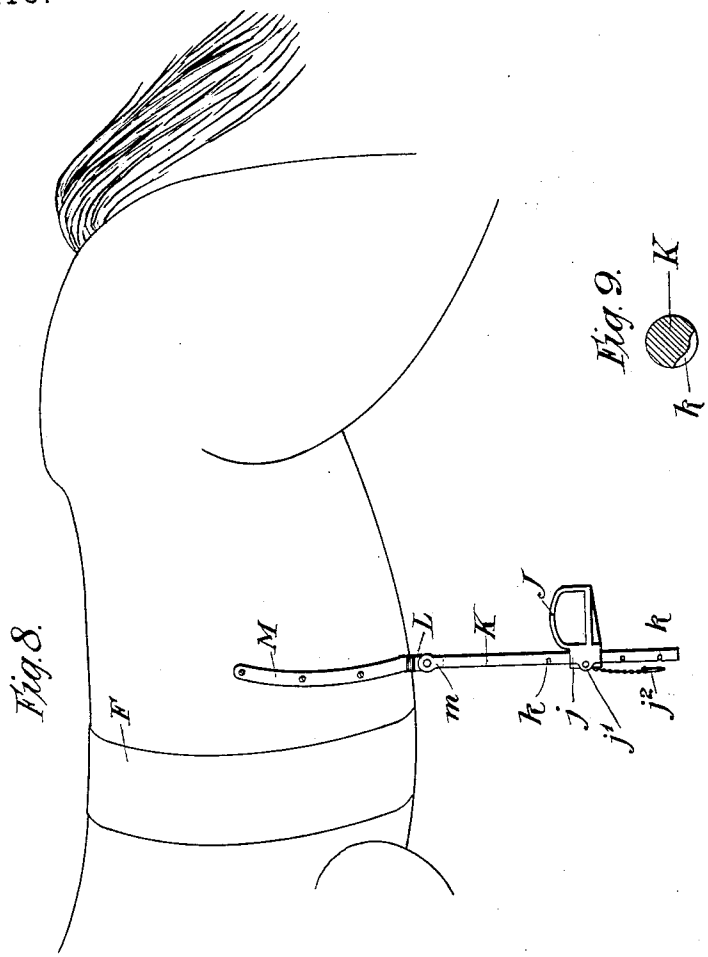

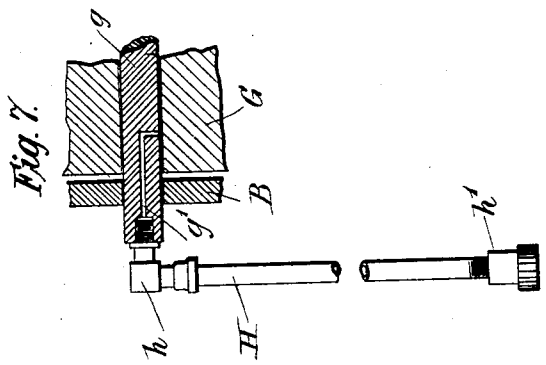

Witnesses
William James Bulgin
Albert Edward Ellen

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John William Cawdery
By his Attorney
George Henry Rayner

UNITED STATES PATENT OFFICE.

JOHN WILLIAM CAWDERY, OF LONDON, ENGLAND.

CARRIAGE FOR GRAVITY-RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 593,413, dated November 9, 1897.

Application filed August 3, 1896. Renewed September 3, 1897. Serial No. 650,535. (No model.)

To all whom it may concern:

Be it known that I, JOHN WILLIAM CAWDERY, engineer, of 73 Archell Road, New North Road, West Kensington, London, England, have invented certain new and useful Improvements in Carriages for Gravity or Switchback Railways, of which the following is a specification.

This invention relates to the construction of carriages for use with gravity or switchback railways; and it consists of improvements in the arrangement shown in Patent No. 518,224, dated April 17, 1894, for "improvements in gravity or switchback railways," granted to me.

This invention relates especially to means by which the carriage, made in the form of a horse, according to the prior specification, may be rendered more effective in its action, especially when passing around curves. I propose to make the framework of the carriage in two main parts, each of which carries a wheel or pair of wheels on which the vehicle runs. These two parts of the frame are connected together by a central joint having a vertical pin which allows the two parts to turn horizontally. I also provide in connection with the wheels a lubricating device which insures the bearings of the carriage-wheels being properly lubricated. This device consists of a tube carrying lubricating material connected by a joint to the spindle or axle of the wheel, this axle being stationary. A hole passes from the end of this joint to the bearing-surface, so that the lubricator can pass from the tube through the joint to the bearing, the tube hanging vertically. This tube is closed by a small screw-cap at its lower end, which can be turned to force the lubricating material through the passage to the bearing. To allow the body of the carriage, which is made in the form of a horse, to bend without disfiguring it and without danger to the rider, a shield-plate is placed at each side, which, when the horse bends, covers the opening at the outer side and prevents any danger of the rider getting pinched. I propose also to employ an improved stirrup which can be adjusted in position and which will prevent the rider placing his legs below the body of the horse and thus rendering them liable to get injured by striking the upper part of the track.

The stirrups I propose to employ consist of a metal loop having a tubular sheath at one side, which is placed over a rod pivoted at its upper end to a small hinged plate. The rod can thus swing in both directions, the pivot and hinge being at right angles, a stop being provided which prevents it swinging below the body of the horse or carriage.

In order that the invention may be more clearly understood, reference is had to the accompanying sheet of drawings; in which—

Figure 1 is a side elevation of the general arrangement with the form of the horse shown in outline. Fig. 2 is an end view, and Fig. 3 a plan of the same, showing only the construction of the carriage. Fig. 4 is a plan of the main part of the carriage, shown to a larger scale. Figs. 5 and 6 are respectively a side and front elevation. Fig. 7 is a detail view of the lubricating device, and Figs. 8 and 9 show the protecting-plate and stirrups.

The construction of the track is similar to that shown in my prior specification, consisting of a number of metal standards A, carrying at the top the rails *a* and at the sides the additional rails *a'*, which serve for guiding purposes.

The carriage I propose to employ is formed in two main parts B and B', the front part B being made in the form of a rectangular frame in plan, carrying a vertical rectangular frame *b* at its rear end. This extension *b* serves to form the connection between the two parts, the vertical pin C passing through it and being secured at top, threading the looped end *b'* of the rear frame. This rear frame is preferably somewhat longer than the front one and consists of parallel bars curved toward the front and terminating in the loops *b'*. When the parts are connected, the two frames are brought together, so that the front of B' enters the vertical frame *b*, resting upon the bottom of this frame, the pin C then connecting the parts, as shown. At the top of the extension *b* a connecting plate or bar D is fitted, secured at its extremity by the pin C. This connection passes to the side bars D', which form the legs of the horse, and extend to the lower rails *a'*, carrying

small rollers or bearing-wheels which run on these rails. A similar bar D^2 extends from the top of the hinged pin to the side bars or legs D' at the rear of the horse, thus completing the frame and strengthening it, at the same time allowing the two parts to freely turn around the pivot-pin. The body of the horse is also made in two parts, divided at the turning-point, the abutting edges being preferably curved in plan, so as to form a gap at each side. This gap or opening is covered by the plate F, (shown in Fig. 8,) the plate being screwed or otherwise secured to the fore part of the horse. This projecting plate allows of a considerable opening or gap, so that the horse can turn at a sharp angle without causing any inconvenience. Each of the frames B and B' carries a wheel G, this wheel being of considerable width and provided with a flange at each side, running upon the two rails at the top of the track. The axle on which they are carried is stationary and is formed with a lubricating hole or passage g', extending from the end and terminating at the side, a short arm at right angles leading the lubricating material to the surface. The lubricator consists of a tube H, hanging vertically from a joint h, the end of which is secured in the extremity of the axle g. To the lower end of the tube H a screw-cap h' is fitted, closing the end of the tube and causing the lubricating material in the tube to be forced into the passage g' when the cap is screwed up. This lubricator is placed in a convenient position for use, hanging at the side of the frame, but concealed by the body of the horse.

The stirrup J (shown in Figs. 8 and 9) is provided with the tubular extension j, the latter having a hole j' extending through it at one side. A pin j^2, carried on the end of a chain, is connected to the stirrup and serves to secure it in position on the stirrup rod or support K. The latter is provided with a series of horizontal grooves or notches k, placed at equal distances apart and extending for about a quarter of a circle. The pin is passed through the hole in the tubular sheath and enters one of these grooves or notches, the arrangement preventing the stirrup dropping below the required position, but allowing it to turn a short distance around the rod. The rod, the upper part of which is of semicircular form, is pivoted to the hinged plate L, carried by the plate M, fixed to the body of the horse. The extension m forms a stop which prevents the hinged plate of the stirrup-rod being turned underneath the body of the horse, but allows of free motion in any other direction. The hinged arm N allows the carriage to shift by a chain from one track to another at the end of its journey.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In carriages for gravity or switchback railways, the combination with separate front and rear frames, running-wheels carried by each frame and extensions bearing against the lower guiding-rails, of a vertical pivot connecting the two frames together, substantially as and for the purposes specified.

2. In carriages for gravity or switchback railways, the combination with a front and rear frame, a vertical frame or extension on the former and a loop at the front of the latter, of a vertical pivot-pin carried by the vertical extension and passing through the loop, top bars secured by the pin, and legs at each end to which the bars are connected, substantially as and for the purposes specified.

3. In a carriage for gravity or switchback railways made in the form of a horse divided transversely, the combination with a front and rear frame within the body of the horse connected together by a central pivot-pin, of a protecting-plate fixed at each side to the body of the horse, and adapted to cover the gap formed on the carriage moving round a curve, substantially as described and shown and for the purposes specified.

4. In a carriage for gravity or switchback railways made in the form of a horse, stirrups carried by a stirrup-rod, pivoted at its upper end to a hinged plate, which is suspended from the fixed plate, the stirrup-rod having a number of notches or grooves by means of which the stirrup is connected, a pin passing through the sheath or tube on the stirrup and engaging with one of the notches, substantially as described and shown, and for the purposes specified.

In witness whereof I have sworn to set my hand in the presence of two witnesses.

JOHN WILLIAM CAWDERY.

In presence of—
ALBERT EDWARD ELLEN,
HERBERT JULIAN CROSS.