(No Model.) 3 Sheets—Sheet 1.

R. M. FRYER.

ELEVATED RAILWAY.

No. 541,662. Patented June 25, 1895.

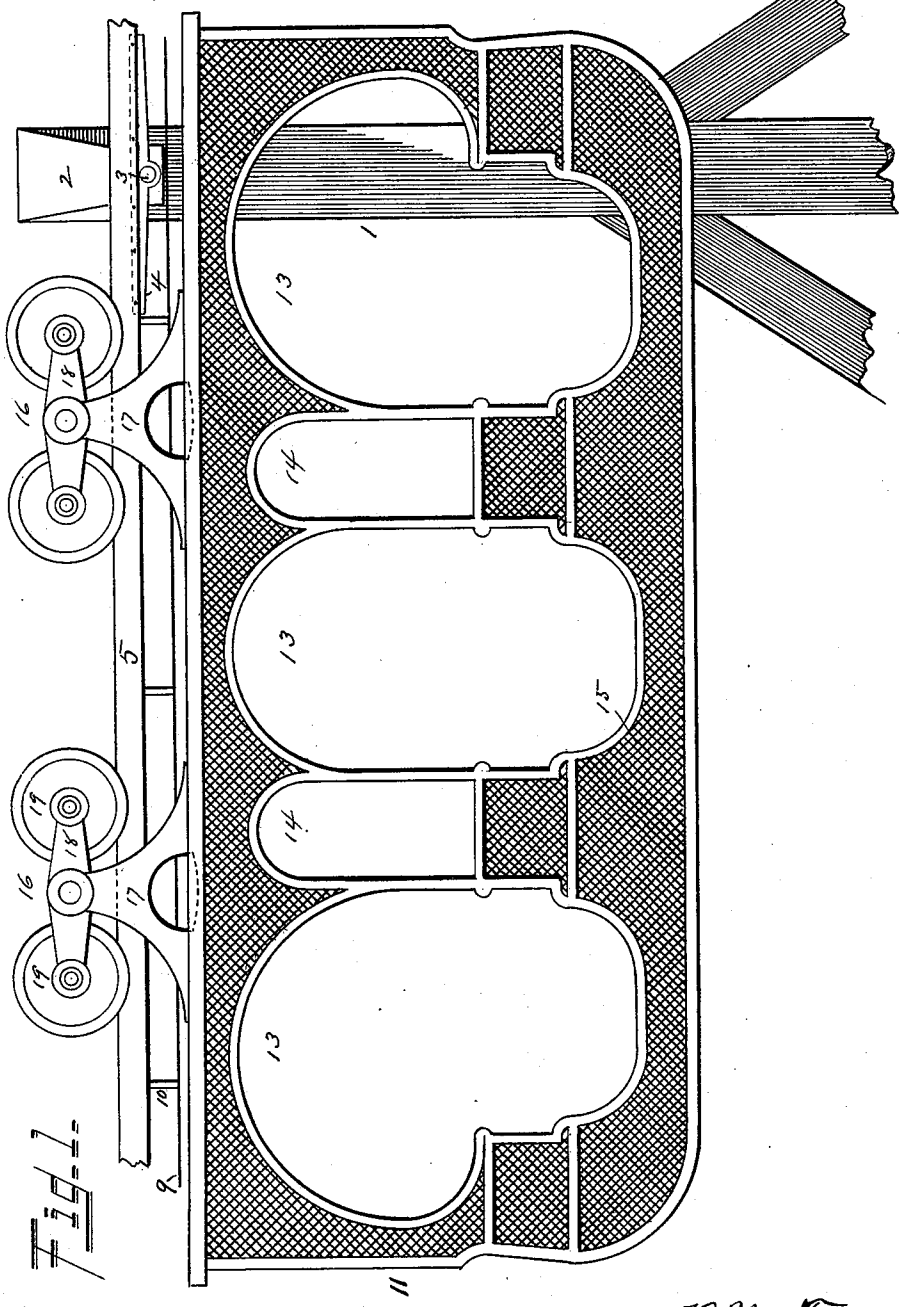


Fig. 1.

R. M. Fryer.
Inventor.

By D. B. Gallatin.
Attorney

Witnesses
G. M. Copenhaver
A. C. Rawlings

(No Model.) 3 Sheets—Sheet 2.

R. M. FRYER.

ELEVATED RAILWAY.

No. 541,662. Patented June 25, 1895.

Fig. 2

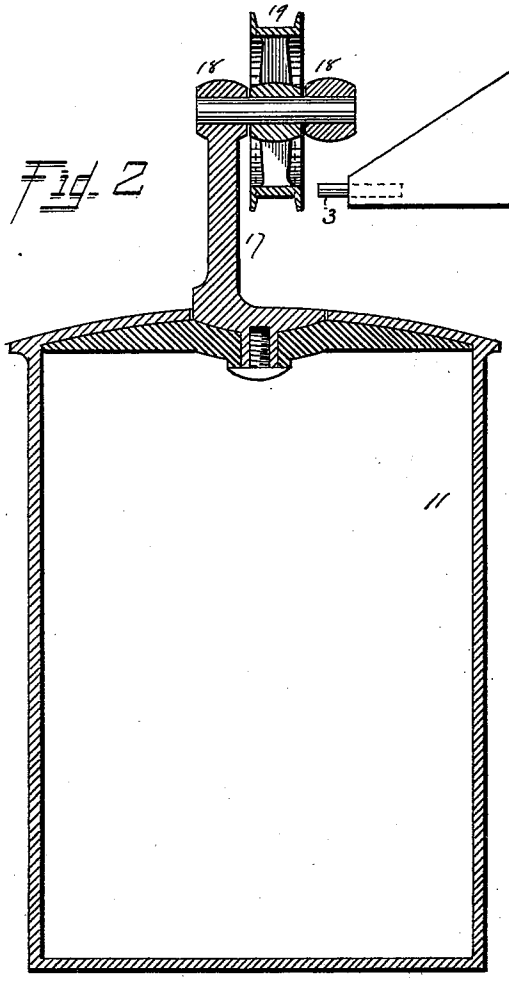


Fig. 4

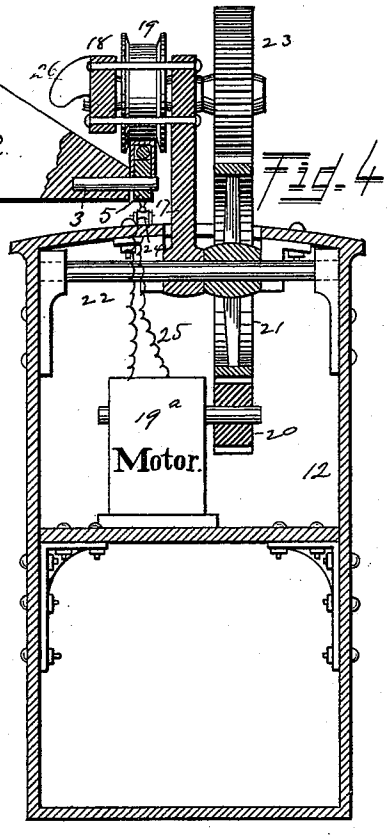


Fig. 5.

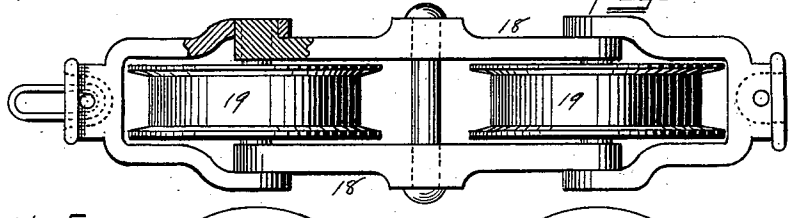
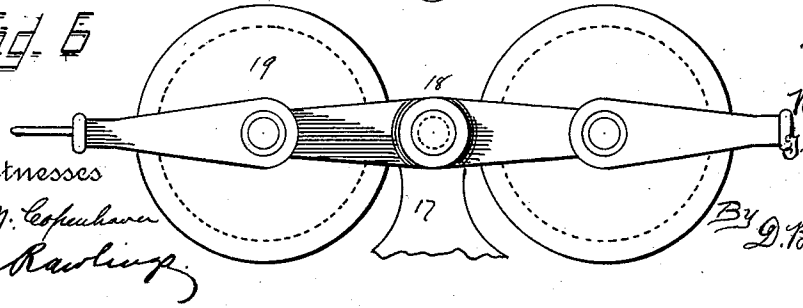


Fig. 6



Witnesses
G. M. Copenhaver
A. C. Rawlings

R. M. Fryer
Inventor.

By D. B. Gallatin
Attorney.

(No Model.) 3 Sheets—Sheet 3.

R. M. FRYER.

ELEVATED RAILWAY.

No. 541,662. Patented June 25, 1895.

Fig. 3.

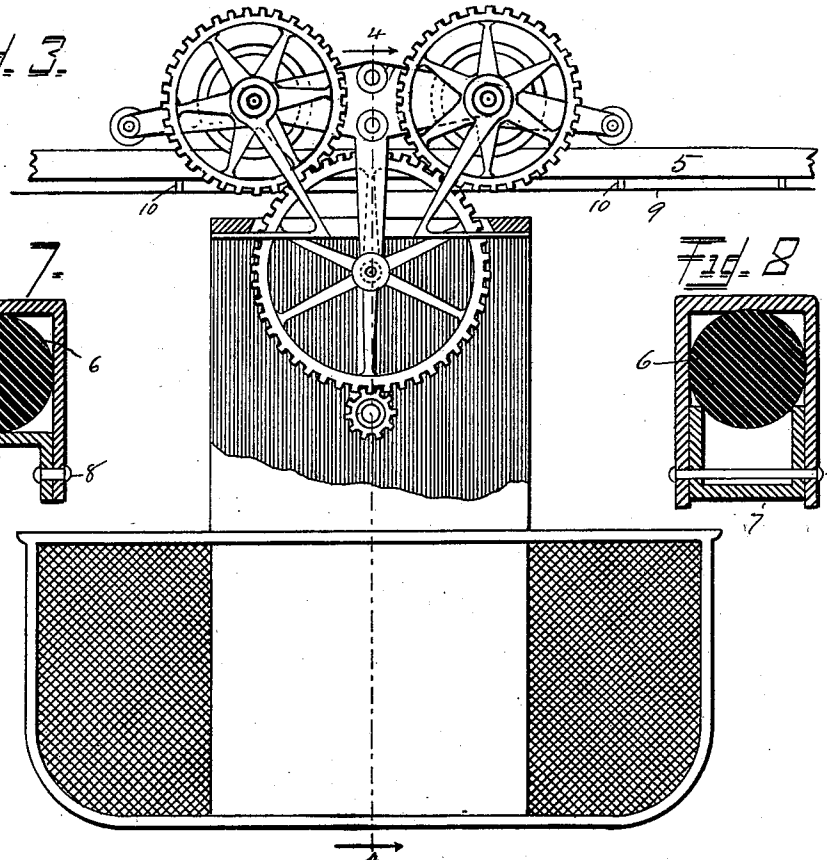


Fig. 7.

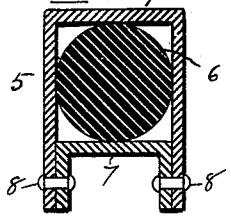


Fig. 8

Fig. 9. Fig. 10. Fig. 11. Fig. 12. Fig. 13. Fig. 14.

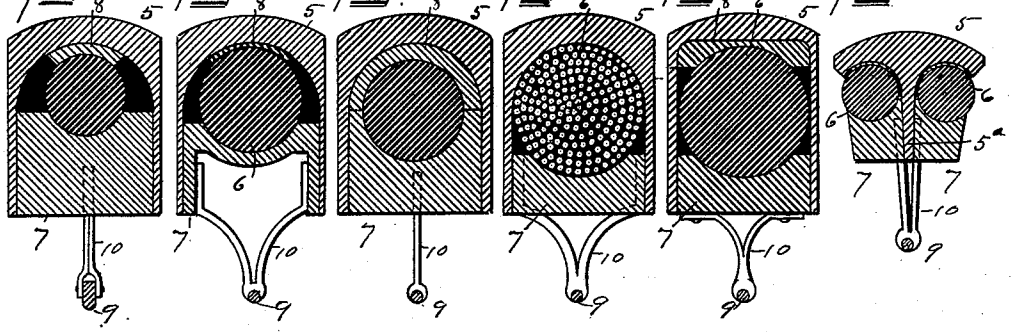


Fig. 15.

Witnesses
G. M. Copenhaver
A. C. Rawlings

R. M. Fryer.
Inventor.

By D. B. Gallatin.
Attorney.

UNITED STATES PATENT OFFICE.

ROBERT M. FRYER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE INTERNATIONAL CONSTRUCTION COMPANY, OF ARIZONA.

ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 541,662, dated June 25, 1895.

Application filed November 12, 1894. Serial No. 528,541. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. FRYER, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Elevated Railways; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to elevated railways in which the cars are suspended from, and run below, the track, and the object thereof is to provide a cheap, simple, and practical roadway adapted to countries and localities where the topographical conditions are unfavorable to the construction and operation of surface roads.

In the accompanying drawings, which illustrate my invention and form a part of this specification, Figure 1 represents, in side elevation, a section of track with a car thereon; Fig. 2, a vertical transverse section on the line 2 2 in Fig. 1; Fig. 3, a side elevation, partly in section, of a driver or motor car, showing its relation to the track and means for applying the motive power; Fig. 4, a vertical transverse section on the line 4 4 in Fig. 3; Fig. 5, a plan view partly in section, and Fig. 6 a side view of one of the trucks; Figs. 7 to 14, inclusive, transverse sections of different constructions of track-rails, and Fig. 15 a side view of the saddle whereby the track-rail is connected with its elevated support.

Referring to the drawings—1 designates a post or standard, and 2 a cross head or arm thereon, for supporting the track rail or rails. These parts may be made either of wood or metal, but for greater stability and durability the latter material is preferable. As represented in Fig. 4 the cross head is adapted to support two track rails at opposite sides of the post. In the ends thereof are projecting pintles 3 on which are mounted saddles 4 connected with, and forming parts of, the track rails, as shown in Fig. 1, and as hereinafter more fully described.

5 designates the track rail which comprises a channeled bar of any preferred shape in cross-section (various forms being shown in Figs. 7 to 14) adapted to be placed over, and supported by, a rod or wire cable (preferably the latter) 6, the rail and cable together constituting the track on which the cars run. The rail is of such height, and the channel therein of such depth, that the sides depend below the supporting cable 6 far enough to receive between them a longitudinally extending bar or plate 7 which breaks joints with the rail sections and takes the place of the ordinary "fish plate" as a means for uniting the rail sections to form a continuous track. The bar or plate 7 may fill the whole channel of the rail, or it may lap only the joints, like the ordinary fish plate. If continuous it may be made of wood, but if in short lengths it should be made of steel or iron for the sake of strength and security.

In Figs. 9 to 14 I show cables of different sizes. Where it is practicable to set the supporting posts close together the smaller sizes may be used but where it is necessary to set the posts farther apart,—as in crossing streams and deep ravines—greater strength will be required, and in such localities the larger sizes of cables will be used. The rails (whatever form or style may be employed) will be of substantially uniform size and adapted to the largest or heaviest cables.

Where the smaller or lighter cables are used,— as in Figs. 9, 10, and 11, blocks 8 may be interposed between the same and the bearing surface of the rail, and in order to prevent galvanic action these blocks may be made of non-conducting material.

Of course the cost of the cables varies with the size and weight thereof and therefore by providing rails adapted to various sizes I am enabled to economize in the cost of construction by using the smaller sizes where it is practicable to set the posts close together, and the larger sizes where the posts are necessarily farther apart and greater strength is required.

Preferred forms of rails and connecting plates are shown in Figs. 7 and 8. In these the top or bearing surface for the car wheels is flat while in Figs. 9 to 14 it is rounded. In long spans,—that is, where the posts are far apart—the rails are liable to twist or rock to one side, and by using a flat surfaced rail and

a wheel with a flat tread, the weight of the car, as the latter progresses, will turn the rail back to its proper position. In these preferred rails the connecting plates 7 are made in the shape of channel-bars to fit snugly within the grooved or channeled rails. In Fig. 7 the side flanges are turned downward while in Fig. 8 they are turned upward, and in both cases the parts are secured together by bolts 8.

In the construction shown in Fig. 7 the saddles 4 may be located in the channels of the connecting plates 7 and secured in place by the bolts 8 which in such case will extend entirely through from side to side of the rail, as in Fig. 8, uniting all the parts. In the construction shown in Fig. 8 the saddles will be located between sections or lengths of the connecting plate 7.

In Fig. 14 I show a form of rail adapted to be supported by double cables located side by side. This is a T-rail with a depending central web 5^a which extends between the two cables. In this form of rail the connecting plates 7 are bolted against the sides of the central web below the cables and they are preferably concaved on their upper surfaces to fit the cables, whereby they serve, in connection with the head of the rail, to hold the cables in place.

Any suitable power may be used for propelling the cars, but in the drawings I show an arrangement for the application of electricity as a motive force, and for this purpose I provide a trolley wire 9 which is supported under the track rail by depending brackets 10 secured to the rail, or to the connecting plates 7, as shown in Figs. 9 to 14.

11 designates the car for passengers or freight, and 12 is the motor car or driver. These cars I propose to make of a frame work of suitable light material,—such, for example, as angle iron bent into form to provide door and window openings 13, 14 and covered and inclosed between and around said openings with light fabric,—such, for instance, as wire netting 15. In this way I provide a light car adapted to the peculiar construction of the track or roadway.

Each car is provided with two trucks 16 comprising vertical standards or bracket arms 17 swiveled in the top, as best shown in Fig. 2, to permit the trucks to turn, as in rounding curves. At the upper end of each of these standards or bracket arms is a yoke 18 rigidly connected or formed integral therewith in which yokes are journaled the double flanged wheels 19, 19 which run on the track.

The motor car 12 carries an electric motor 19 the shaft of which is provided with a driving pinion 20 geared with a wheel 21 mounted on a shaft 22, and gearing in turn with wheels 23, 23, fixed on the journals of the truck wheels 19.

Fig. 3 shows two gear wheels 23, but manifestly one of these may be omitted.

24 designates the trolley of any suitable or preferred construction mounted on the top of the motor car and connected with the motor by wires 25.

In order to avoid sharp angles at the points where the track is supported I propose to make the saddles 4 of resilient metal so that they may spring and yield under the weight of the car as the latter passes thereover. This, in connection with the rocking motion of the saddles on their supports provides a smooth and easy track and avoids jars and undue strains.

Each of the trucks is provided at the side thereof with a laterally projecting arm or hook 26 which, in case of derailment, will catch on the track rail and prevent the car from falling to the ground.

Having now described my invention, I claim—

1. The combination of a grooved or channeled rail, a supporting rod or cable located in the channel of the rail, a saddle also located in the channel of the rail below the cable, and a pivotal support for the saddle.

2. A track for elevated railways comprising a rod or cable, a channeled or grooved rail thereon, the side flanges of the rail extending below the cable, and connecting bars in the channel of the rail below the cable, said bars overlapping the joints between the rails and bolted to the flanges thereof, whereby they serve to connect the rails and to hold the same in place on the cable.

3. The combination of a supporting rod or cable, a grooved or channeled rail thereon, the side flanges of the rail extending below the rod or cable, connecting bars secured in the channel below the cable, said bars lapping the joints and connecting the rails, and pivotal supports for sustaining said parts.

4. In a continuous track for elevated railways the combination of a rod or cable, elevated supports therefor, grooved or channeled rails thereon having their side flanges extending below the same, connecting bars and saddles secured in the channel of the rail below the cable, and pivotal connections between the saddles and the elevated track supports, as shown and described.

5. In an elevated railway track the combination of a rod or cable, elevated supports therefor, grooved or channeled rails thereon, the side flanges of the rails extending below the cable, and connecting bars located wholly within the channels of the rails below the cable, whereby the rails are connected together and secured in place on the cable, and the latter protected, as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBT. M. FRYER.

Witnesses:
EDWIN CRUSE,
GRACE M. FINLEY.