

(No Model.)

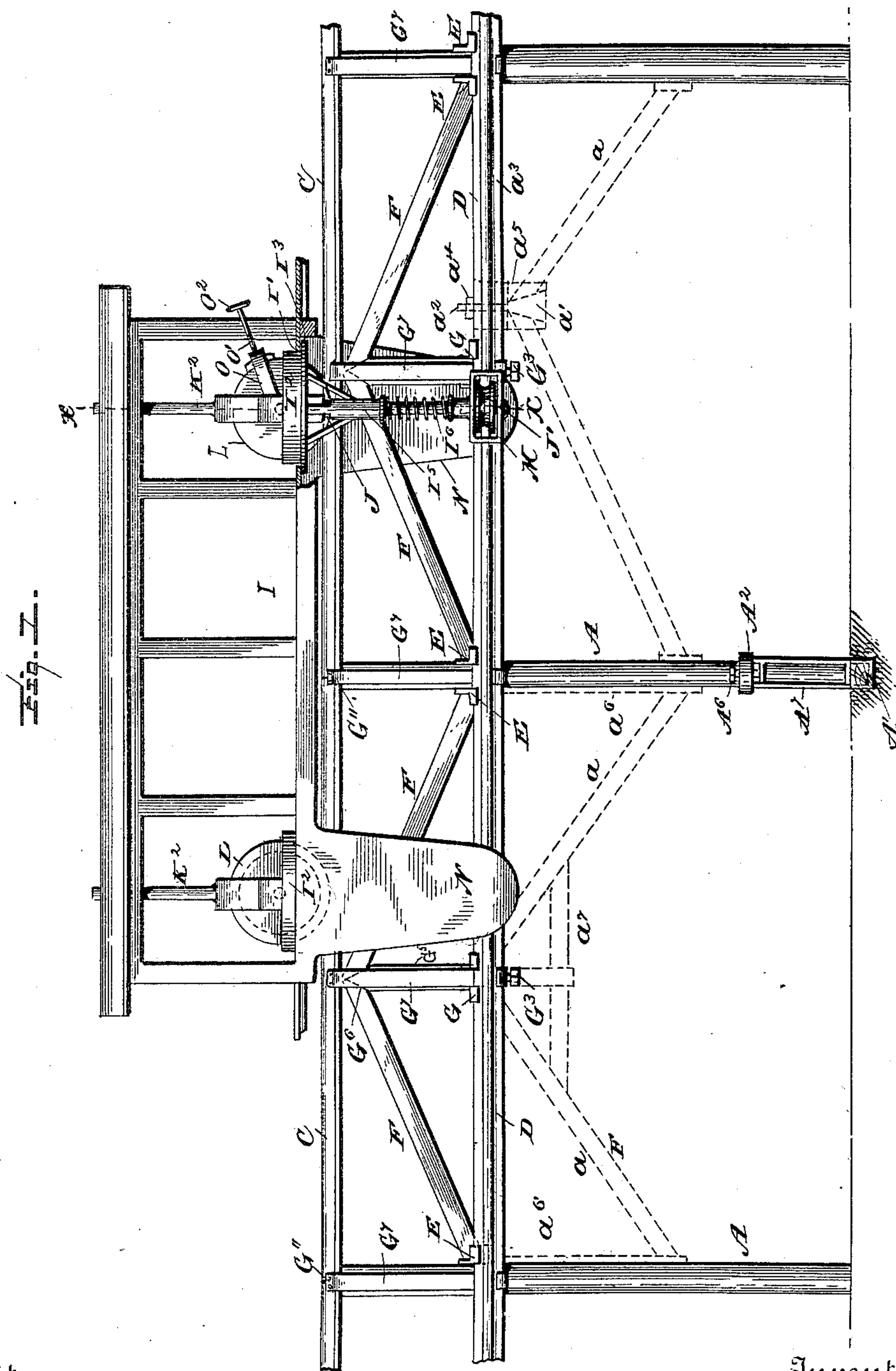
4 Sheets—Sheet 1.

E. M. TURNER & J. P. TAYLOR.

ELEVATED RAILWAY, &c.

No. 424.693.

Patented Apr. 1, 1890.



Witnesses

L. C. Hills.  
H. Sutherland.

Inventors:

*Ephraim M. Turner,  
and James P. Taylor.  
ER Stocking  
Atty.*

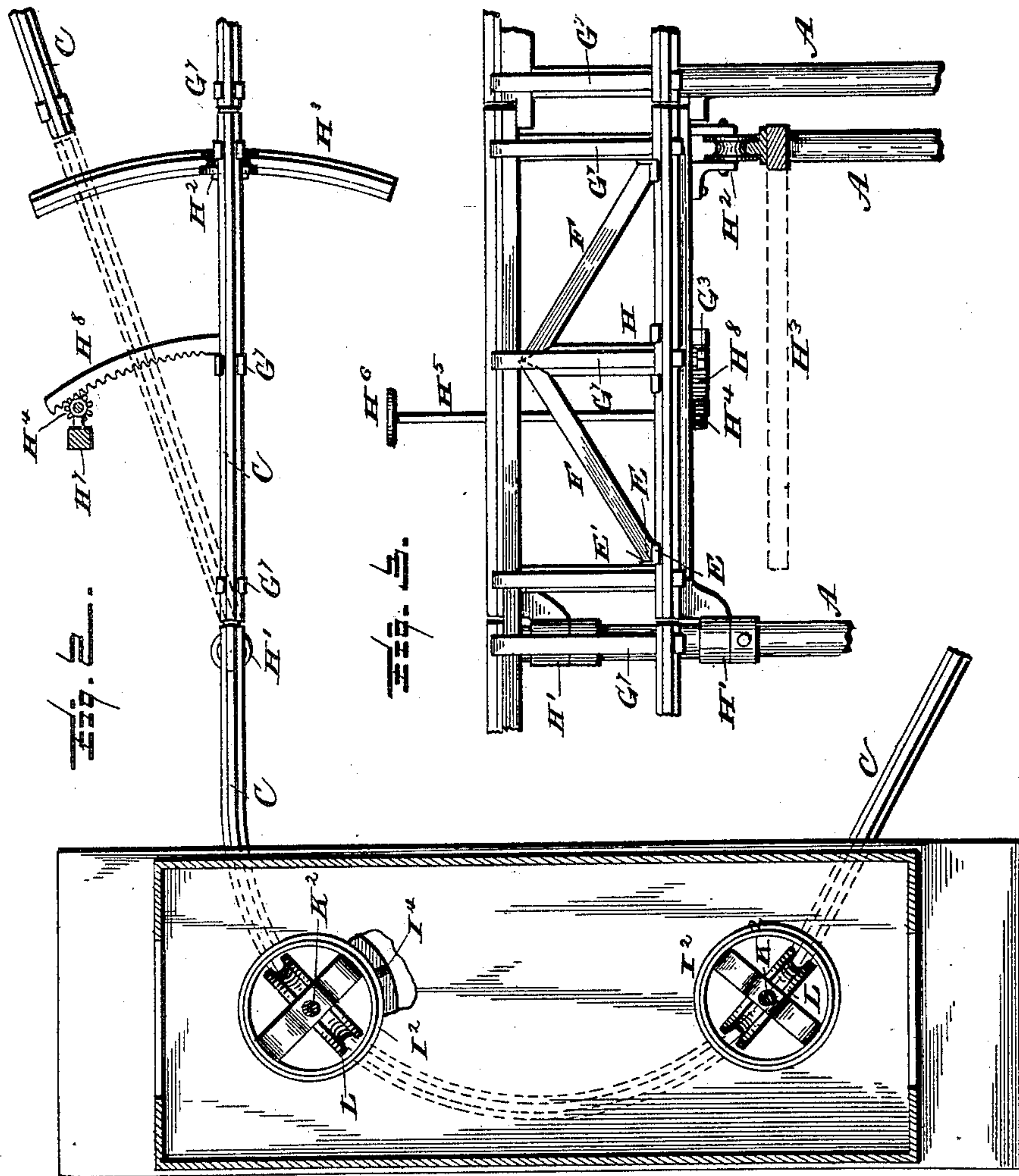
(No Model.)

4 Sheets—Sheet 2.

E. M. TURNER & J. P. TAYLOR.  
ELEVATED RAILWAY, &c.

No. 424,693.

Patented Apr. 1, 1890.



Witnesses

*L. C. Wells*  
*H. Sutherland*

Inventor

*Ephraim M. Turner and*  
*James F. Taylor.*  
*E. B. Stocking*  
*Att'y.*

(No Model.)

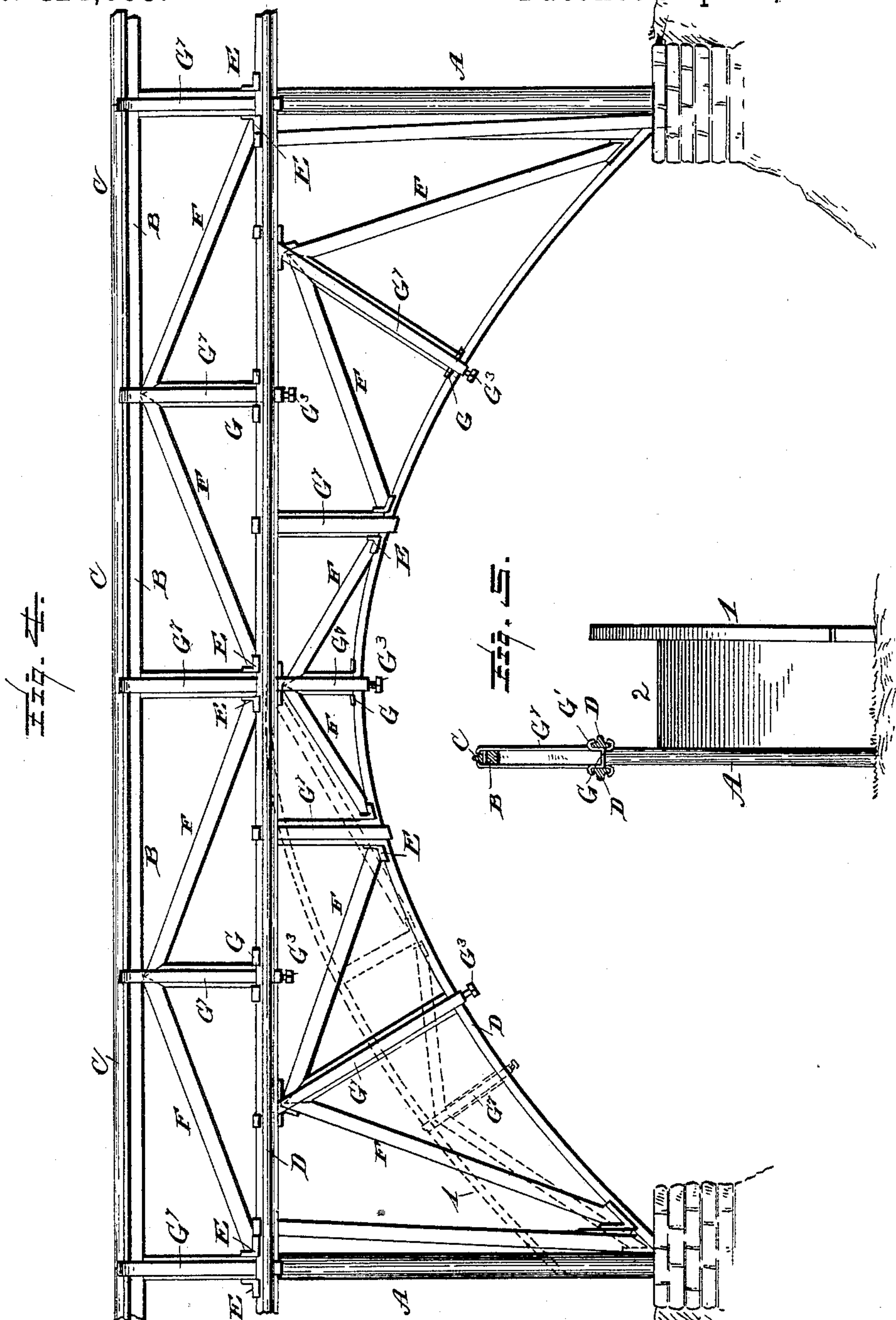
4 Sheets—Sheet 3.

E. M. TURNER & J. P. TAYLOR.

ELEVATED RAILWAY, &c.

No. 424,693.

Patented Apr. 1, 1890.



Witnesses

L. C. Hills.  
H. Sutherland.

Inventors:

Ephraim M. Turner.  
James F. Taylor.  
E. B. Stocking  
Atty.



(No Model.)

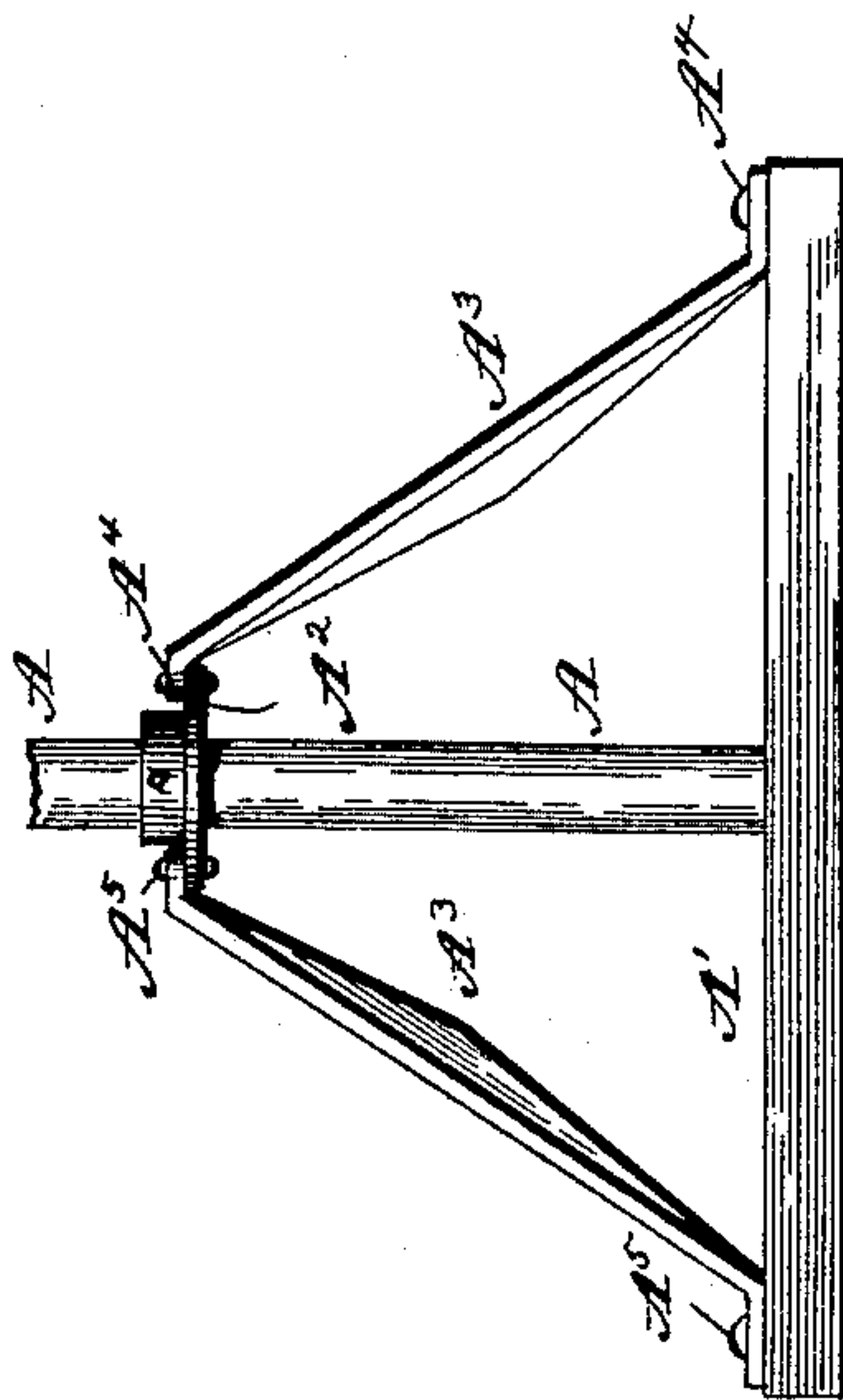
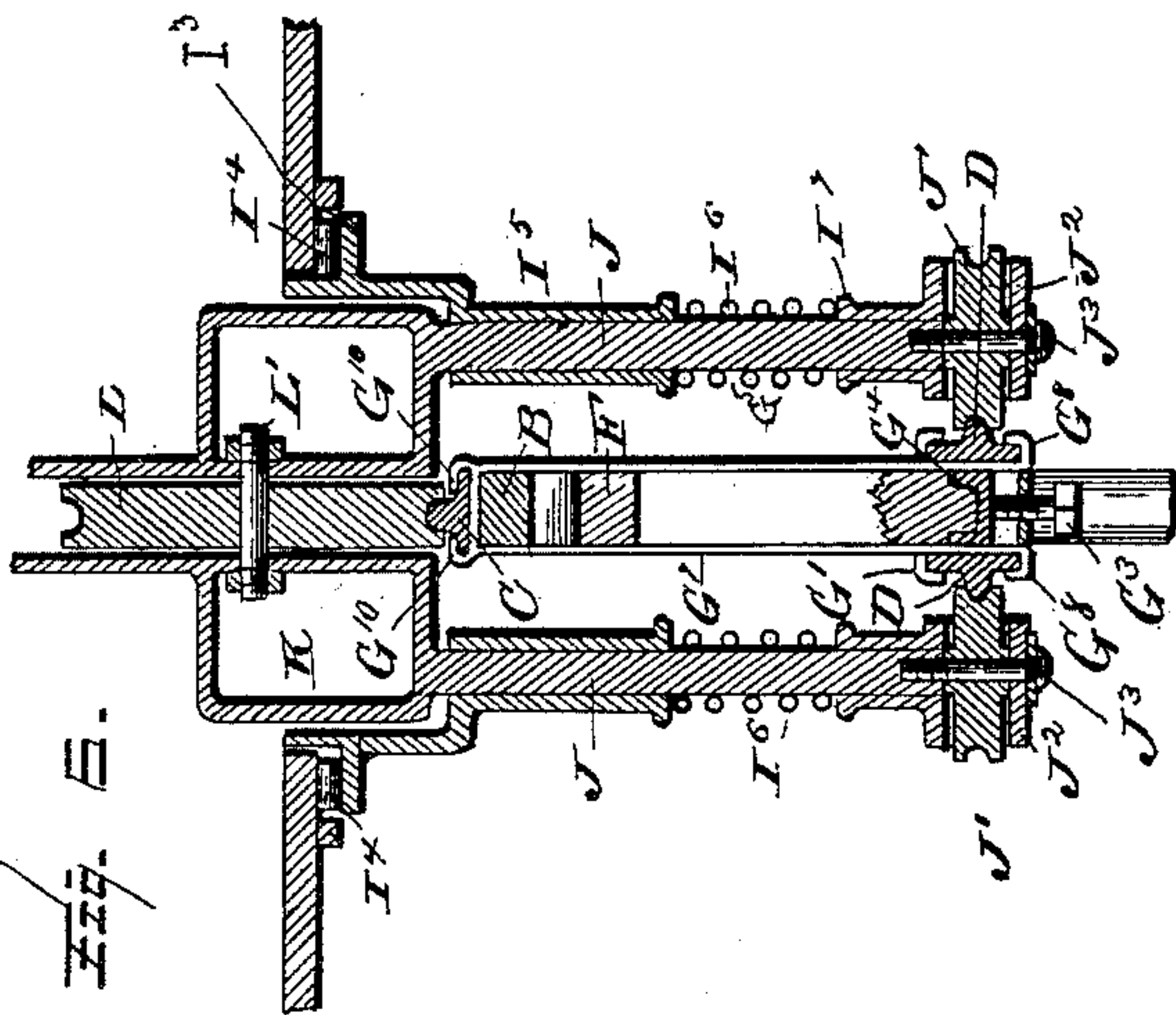
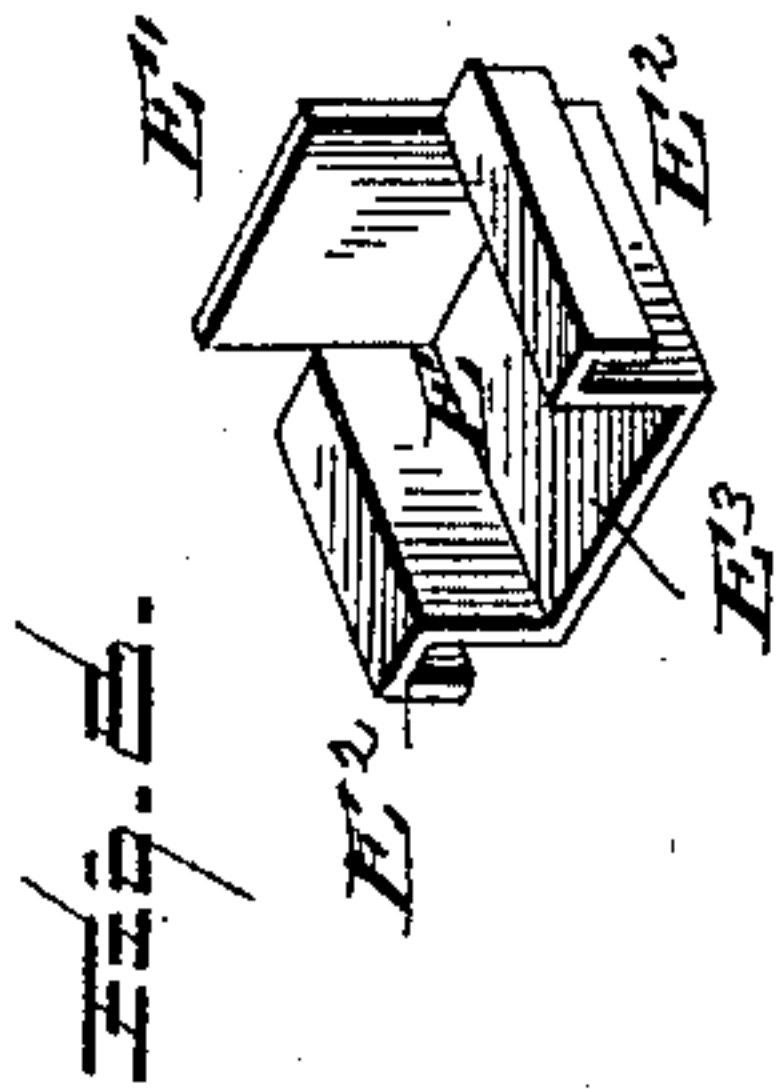
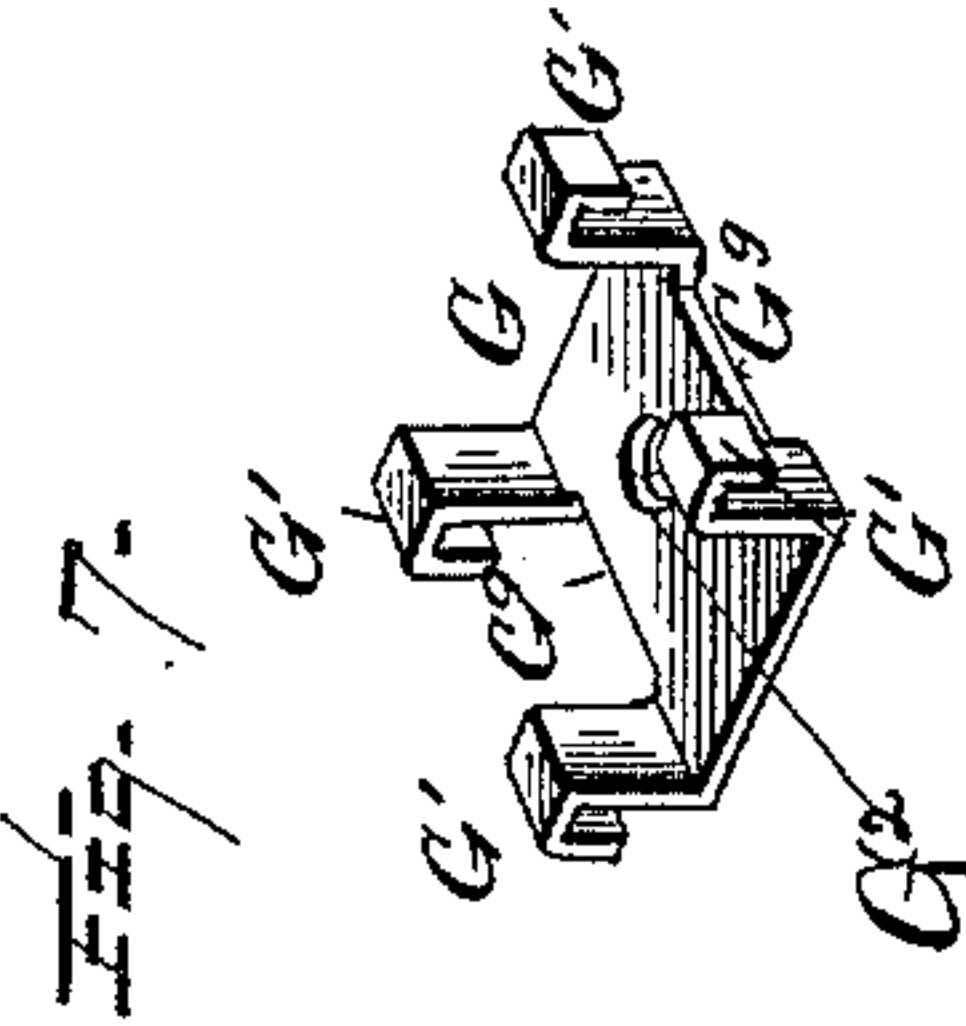
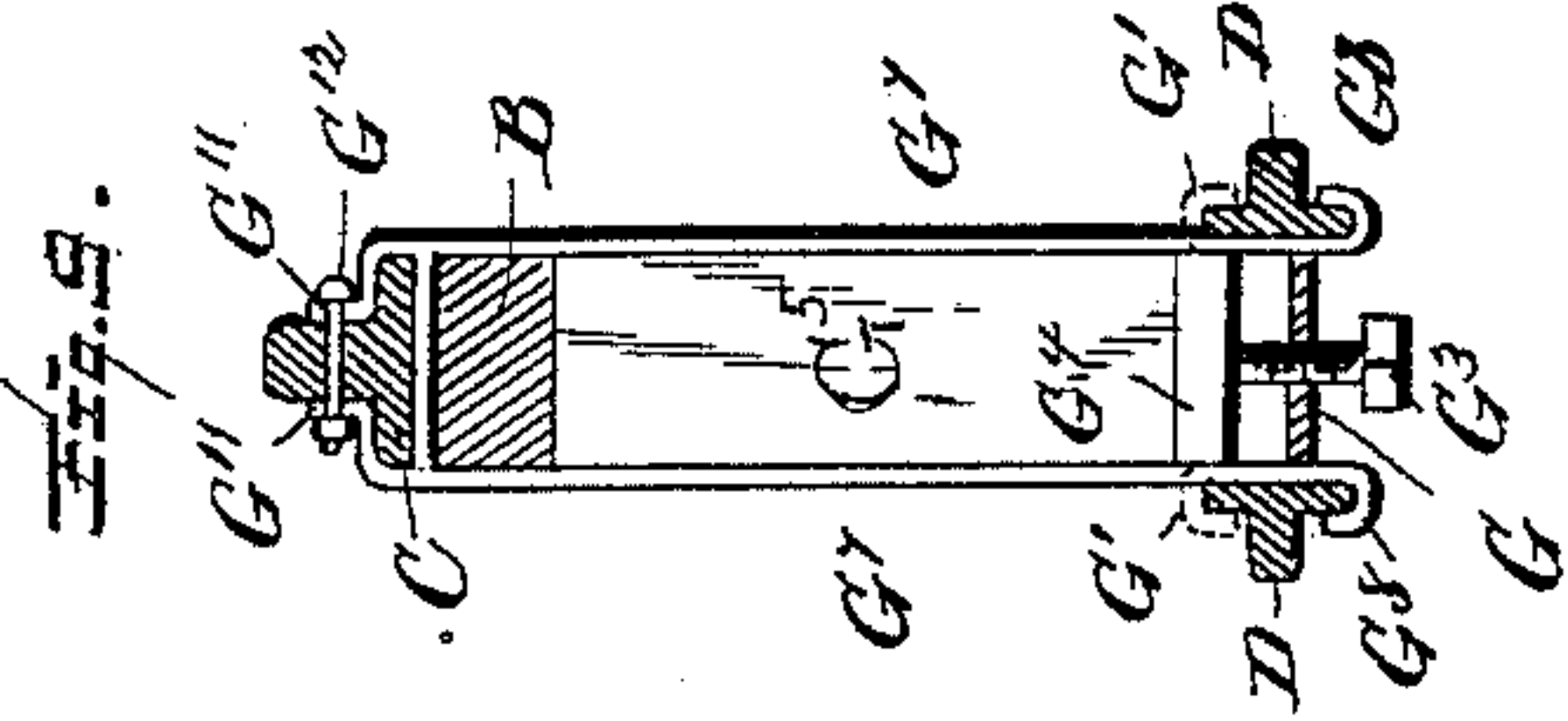
4 Sheets—Sheet 4.

E. M. TURNER & J. P. TAYLOR.

ELEVATED RAILWAY, &amp;c.

No. 424,693.

Patented Apr. 1, 1890.



Witnesses

L. C. Hills.  
H. Sutherland.

Inventor

*Ephraim M. Turner*  
*James P. Taylor.*

E. B. Stocking  
Atty.



# UNITED STATES PATENT OFFICE.

EPHRAIM M. TURNER AND JAMES P. TAYLOR, OF FORT WORTH, TEXAS,  
ASSIGNORS OF ONE-THIRD TO ROBERT E. MADDOX, OF SAME PLACE.

## ELEVATED RAILWAY, &c.

SPECIFICATION forming part of Letters Patent No. 424,693, dated April 1, 1890.

Application filed November 18, 1889. Serial No. 330,694. (No model.)

*To all whom it may concern:*

Be it known that we, EPHRAIM M. TURNER and JAMES P. TAYLOR, citizens of the United States, residing at Fort Worth, in the county of Tarrant, State of Texas, have invented certain new and useful Improvements in Elevated Railways and other Structures, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in elevated railways and other structures; and it has for its object, among others, first, to provide an improved track having provisions for readily tightening the track, each span or section being tightened by means of a single tightening device arranged, preferably, substantially at the center of the section; second, to provide an improved truck with guiding rollers or pulleys, the weight of the truck being carried upon yielding supports; third, a simple and improved swivel or turning device or connection between the car and track, whereby the turning of curves is more easily accomplished with a minimum of friction; fourth, to so mount the truck upon the track that displacement or removal thereof sidewise is impossible; fifth, to provide an improved switch; sixth, to provide for a road-bed upon a span in crossing a stream or other analogous obstruction, and, finally, to improve generally upon all the devices employed in connection with the track and truck and its accessories.

To the accomplishment of the above ends the invention consists in the novel features and the construction and combination of parts, all as more fully hereinafter described, shown in the drawings, and then particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a side elevation with parts broken away, illustrating a truck mounted upon a section of a track and all embodying our improvements. Fig. 2 is a top plan, partly in horizontal section, showing the car in the act of turning a curve. Fig. 3 is a side elevation of the parts illustrated at the right of Fig. 2.

Fig. 4 is a side elevation of a span. Fig. 5 is an end elevation of Fig. 4 with the track in vertical cross-section. Fig. 6 is a vertical cross-section through the line *xx* of Fig. 1. Fig. 7 is a perspective detail showing a saddle-piece or gage for holding the rails at their proper relative distance apart. Fig. 8 is a perspective view of the foot-brace. Fig. 9 is a detail in vertical section showing a saddle-piece in place and the side pieces formed to serve as fish-plates.

Like letters of reference indicate like parts throughout the several views.

In the following description we shall refer first to the construction of the track. It is supported upon uprights *A*, which at their lower ends are secured in position in any suitable manner so as to hold them rigid against both sidewise and endwise displacement. In Fig. 6 we have shown a convenient and perhaps preferable manner of holding the lower end, but of course do not restrict ourselves to such form. This construction may be employed either above or under ground. In this figure, *A'* is a suitable base-plate or cross-timber, *A<sup>2</sup>* is a collar or flange plate upon the upright, and *A<sup>3</sup>* are brace-bars having flanged ends *A<sup>4</sup>*, which rest upon the upper face of the flange of the collar *A<sup>2</sup>* and upon the upper face of the base-plate *A'*, being firmly secured in position by means of the vertical bolts or other suitable fastenings *A<sup>5</sup>*. Another form of fastening for the lower ends of the uprights is shown in Fig. 1, in which *A'* is the base, *A<sup>2</sup>* the flanged collar, and *A<sup>6</sup>* a set-screw passed vertically through the flange of said collar and bearing upon a brace *A<sup>7</sup>*. The tightening of the screw serves to tighten the parts. These are but two of the various methods which we may employ for this purpose.

Along the upper ends of the uprights, and preferably resting upon the top thereof, is a bed-piece *B* to support the rail, as shown more clearly in Fig. 6, although we may sometimes omit this bed-piece and support or rest the rail directly upon the upright, as shown in Fig. 1; but we prefer the bed-piece. The rail *C* may be of any of the forms suitable to the purpose, but preferably a T-rail, as shown in Fig. 6, the flanges of which rest



upon the bed-piece or upon the posts or uprights, as the case may be, and is held thereto preferably in the manner shown, although this may be varied without departing from the spirit of our invention.

D are guide-rails upon diametrically-opposite sides of the uprights at a suitable distance below the rail C, as indicated clearly in Fig. 6.

E is a foot-brace, which serves also as a gage to keep the guide-rails at a regulated distance apart. This foot-brace is formed with a vertical flange E', designed to bear against the uprights and the turned-over flanges E<sup>2</sup> upon opposite sides, as shown more clearly in Fig. 8, and these flanges are designed to embrace the upper edges of the guide-rails and prevent separation or spreading thereof. The bottom E<sup>3</sup> of this foot-brace is designed to receive the lower end of the inclined brace F, as seen more clearly in Figs. 1 and 3. The lower end of this brace F is cut upon two bevels, so as to provide a firm bearing both against the bottom E<sup>3</sup> and against the vertical portion E' of this foot-brace. We propose to employ two of these braces for each section or span of the track, there being one or more spans between each two uprights, as may be desired, employing a foot-brace at the lower end of each of the inclined braces. The upper ends of the inclined braces should also be formed with two bevels in order to give increased bearing, as will be readily understood, the upper beveled ends having a bearing against the under side of the bed-piece, or of the rail in case the bed-piece is omitted.

In order to tighten the parts and straighten or level the track, we employ the following: G is a saddle-piece or gage having side flanges G', designed to engage the upper flanges of the guide-rails, and is provided at its bottom with an opening G<sup>2</sup> for the passage of the screw G<sup>3</sup>, which passes upward through the bottom of said saddle-piece and through a casting G<sup>4</sup>, into which is fitted and supported the lower end of a short vertical piece G<sup>5</sup>, the upper end of which is beveled upon opposite sides to form a wedge-shaped end fitting substantially the bevels upon the under side of the adjacent upper end of the two inclined braces F, as shown clearly in said Fig. 1. By screwing up upon the screw G<sup>3</sup> the upper ends of the inclined braces F are separated, and thus the parts are tightened. This forms a simple and efficient tension device for tightening up the parts when occasion may require. In order to form a better brace, we employ side braces G<sup>7</sup>, as shown more clearly in Fig. 9, the lower ends of which are bent upward, as at G<sup>8</sup>, forming a hook to embrace the lower edges of the guide-rails. When we employ these side braces G<sup>7</sup>, the sides of the saddle-piece G are cut away, as shown at G<sup>9</sup>, to provide room for said braces. Each of these braces may be a continuous piece, forming a sort of saddle, the bight of which rests upon the upper face of the bed-piece, or upon the

upper end of the upright in case a bed-piece is not employed, and is formed with ears G<sup>10</sup>, which rest upon the upper face of the flanges of the rail and serve as fish-plates, as shown in Fig. 6. At a joint in the rails we employ the form shown in Fig. 9, in which each of the braces G<sup>7</sup> is formed of two parts, as shown in said figure, the upper ends being turned over and upward, as shown at G<sup>11</sup>, to form fish-plates, through which and through the web of the rail pass suitable securing-bolts (one or more) to hold the parts together, as shown in said Fig. 9.

Instead of the casting G<sup>4</sup>, above described, and shown in Fig. 6, we may sometimes dispense therewith and employ a metal upright, with the end of the screw G<sup>3</sup> bearing directly on the lower end of said upright, as shown in Fig. 9. Where there is more than one span between two uprights the lower ends of the inclined braces will rest upon the bottom of the saddle-piece G, as will be readily understood.

We may sometimes employ for tightening the parts the construction shown in dotted lines at the right of Fig. 1, in which *a* are inclined braces, their lower ends suitably held to the uprights with their adjacent ends beveled, and between these beveled ends is a wedge *a'*, provided with a screw-threaded shank *a*<sup>2</sup>, passing through the timbers *a*<sup>3</sup> and provided with a nut *a*<sup>4</sup>, by the screwing up of which the wedge is forced between the ends of the inclined braces *a*, and the parts thus tightened. We employ a plate or fastening *a*<sup>5</sup>, secured to the under side of the timber *a*<sup>3</sup>, for the purpose of holding the upper ends of the braces *a*. Still another form of tightening is illustrated at the left of Fig. 1, in which the inclined braces are held between guide-pieces or saddles *a*<sup>6</sup>, and near their upper ends braced by the cross-bar *a*<sup>7</sup>, which is tightened by means of a wedge, bolt, and nut, in the same manner as illustrated at the right of Fig. 1, the cross-bar *a*<sup>7</sup> acting as the wedge.

As an additional brace in long spans—as, for instance, across a stream—we employ the form of bracing illustrated in Fig. 4, which is practically the same as that above described, but arranged as shown in said Fig. 4, the principle of tightening being the same. In case it is desired to provide a driveway across the stream we may readily construct the same at small expense by running a second arch, as illustrated at 1 in Figs. 4 and 5, connecting the two arches in any suitable manner to support and form a road-bed 2, as shown in said Fig. 5.

At the places where it is desired to switch from one track to another we erect two uprights in suitable position and arrange a movable portion of the track, as at H, to swing out on a suitable pivot, with means for tightening up when necessary, and at the free end upon its underside is journaled a grooved roller H<sup>2</sup>, which is designed to travel upon a curved track H<sup>3</sup>, suitably supported in prox-



imity to the two uprights, as shown in Fig. 3, a suitable platform  $H^3$  being provided for the purpose of oiling the pulley or tightening the parts of the movable portion of the track.

5 This movable or switch portion is operated by means of a pinion  $H^4$ , carried by a vertical shaft  $H^5$ , having a suitable handle  $H^6$  and journaled in a suitable support  $H^7$ , the said pinion engaging with a segmental rack-bar  $H^8$ , attached to the movable portion, as illustrated in Fig. 2. The rotation of the shaft  $H^5$  causes the movable portion  $H$  to move upon its pivot or hinge to switch the train from one track to the other, as will be clearly understood upon reference to Fig. 2.

15 I designate a car or truck of any desired size, and is constructed in either one or two stories and of any pattern, except as hereinafter specified. Near each end the platform or bottom of the car is provided with an aperture  $I'$ , in which is placed the flange  $I^2$  of the disk  $I^3$ , the weight of the car resting upon said disk, anti-friction rollers  $I^4$  being provided between the car platform or bottom and the disk, as shown clearly in Fig. 6. This disk has depending therefrom the sleeves  $I^5$ , the lower ends of which rest upon the springs, preferably coiled,  $I^6$ , the lower ends of which have a bearing upon the upwardly-extending sleeves  $I^7$ , carried by a shaft  $J$ . The shaft  $J$  depends from the frame  $K$ , in which the pulley or roller  $L$  is journaled upon the transverse shaft  $L'$ , the said pulley  $L$  being grooved, as shown, and designed to travel upon the rail  $C$ . (See particularly Fig. 6.) It will be observed that by this construction the entire weight of the car is sustained by the springs  $I^6$ . The lower ends of the shafts  $J$  carry grooved pulleys or rollers  $J'$ , designed to engage and travel upon the guide-rails  $D$ , as shown more clearly in said Fig. 6, a boxing  $J^2$  being provided through which and into the lower end of the sleeve  $I^7$  passes a screw  $J^3$ , which serves as the pintle of the roller  $J'$ , and by removal of which the roller may be removed when necessary. Extending upward from the pulley-frame  $K$  is a shaft or arm  $K^2$ , the upper end of which is designed to turn loosely in the opening in the top of the car, as shown in Fig. 1, the disk, frame, pulley, and depending arms being designed to turn about a center upon said shaft  $K^2$ , being guided by the upwardly-extending flange or arm  $I^2$  of the disk in the walls of the aperture  $I'$  in the bottom of the car. By this means we are enabled to turn a very sharp curve without any danger of accidents and with very little friction. Fig. 2 shows the position the parts assume in going around a sharp curve.

60 Instead of the boxing for the roller  $J'$ , as shown in Fig. 6, we sometimes employ the form shown in Fig. 1, in which a square box  $M$  is employed; but either form may be used, as preferred.

65 In order to protect and hide from view in a one-story car the depending portions—namely, the sleeves, springs, and rollers—we

provide fenders or shields  $N$ , which depend from the sides of the car opposite the rollers and springs, as shown in Fig. 1, and serve to 70 hide the same from view and also to protect them from dust.

While in the drawings we have shown a car equipped with two rollers  $L$  and their attachments, it is evident that the number may 75 be varied. In short cars we may employ but one and in longer cars we may employ three or more.

The form of brake we preferably employ is shown at the right of Fig. 1, wherein  $O$  is a 80 yoke attached in any suitable manner to the truck-frame  $K$ , and through the cross-bar of which is tapped a screw-threaded shaft  $O'$ , having suitable handle or wheel  $O^2$ , and carrying at its inner end a brake-shoe adapted 85 to bear against the pulley or roller  $L$ , and operating in a manner which will be readily understood.

What we claim as new is—

1. A car for elevated roads wherein the 90 weight of the car is carried by a yielding support vertically movable and rotatable relatively to the car-body, substantially as described.

2. A car for elevated roads, consisting of a 95 body and a roller-support and a support for the car having an elastic bearing capable of movement vertically independent of the roller and rotatable relatively to the car-body, substantially as described. 100

3. In a car for elevated roads, the combination, with a car-body and a supporting-roller, of a yielding support free to move vertically independent of the roller and rotatable relatively to the car-body, substantially as described. 105

4. In a car for elevated roads, the combination, with the body, of a yielding support for sustaining the weight of said body, movable independent of the roller, and said roller and support being rotatably connected with the body, substantially as described. 110

5. The combination, with the body, of a support therefor and a supporting-roller, said support being capable of vertical play independent of said roller, and both support and roller rotatable together, substantially as described. 115

6. The combination, with the disk working in an aperture in the car-bottom and yieldingly held by springs which support the car, of a frame carrying the supporting-roller and provided with depending portions carrying guide-rollers, substantially as described. 120

7. The combination, with the car-body and 125 the disk having a flange supporting the body and a roller bearing between said disk and body, of a roller-supporting frame having depending portions passing through sleeves on said disk and carrying guide-rollers, and the springs for sustaining the weight of the car, substantially as described. 130

8. The combination, with the car-body and the disk having depending sleeves, of the



roller-frame having depending portions within said sleeves and carrying upwardly-extending sleeves at their lower end, and springs on the depending portions of the roller-frame  
5 between said sleeves, substantially as described.

9. The combination, with the car-body, of the disk having depending sleeves, the roller-frame having depending portions working  
10 within said sleeves and carrying guide-rollers, and upwardly-extending sleeves at their lower ends, the springs around the depending portions between said sleeves, and the whole rotatably connected with the car, substan-  
15 tially as described.

10. The combination, with the car and the disk having depending portions yieldingly supported, of the roller-frame having depending portions carrying guide-rollers and  
20 provided with an upwardly-extending portion rotatably connected with the top of the car, substantially as and for the purpose specified.

11. The combination, with the car-body and  
25 the depending rollers and spring-supports, of shields on the car for protecting said parts, substantially as described.

12. The combination, with the rail and its support, of the inclined braces, a tension device acting upon said braces, and foot-pieces  
30 and guides for the lower ends of the braces, substantially as described.

13. In elevated roads, a combined support and gage having flanges to embrace the upper edges of the guide-rails, substantially as  
35 described.

14. The combination, with the rail and its support, of the side braces having upwardly-extending portions to form fish-plates, sub-  
40 stantially as described.

15. The combination, with the main rail and guide-rails, of the side braces having upturned ends to engage the lower edges of the guide-rails, and a saddle-piece and gage, sub-  
45 stantially as and for the purpose specified.

16. The combination, with the main rail and guide-rails, of the side braces having up-

turned ends to engage the lower edge of the guide-rails and upturned portions to form fish-plates, substantially as described. 50

17. The combination, with the main rail and guide-rails, of the side braces having upturned ends to engage the lower edges of the guide-rails, upturned portions to form fish-plates, and a tension device between said side  
55 braces, substantially as and for the purpose specified.

18. The combination, with the uprights, the bed-piece, the main rail, guide-rails, and inclined braces, of the vertical piece with its  
60 ends between the adjacent ends of the inclined braces and a tension-screw for vertically adjusting said vertical piece, substantially as described.

19. The combination, with the uprights, the  
65 bed-piece, the main rail, and the guide-rails, of a saddle-piece and gage having flanges embracing the upper edges of the guide-rails, a vertical piece supported by the saddle-piece, and a tension-screw passed through the  
70 saddle-piece and serving to adjust vertically the vertical piece, substantially as and for the purpose specified.

20. The combination, with uprights, the bed-piece, the main rail, guide-rails, and inclined  
75 braces, of the side piece having flanges embracing the upper edges of the guide-rails, the side braces having upturned ends engaging the lower edges of the guide-rails, the vertical piece having its upper end inserted  
80 between the ends of the inclined braces, and an adjusting-screw for vertically raising the vertical piece, substantially as and for the purpose specified.

In testimony whereof we affix our signatures in presence of two witnesses. 85

EPHRAIM M. TURNER.

JAMES P. TAYLOR.

Witnesses to Turner's signature:

E. B. STOCKING,

J. MACKAYE.

Witnesses to Taylor's signature:

H. C. JEWELL,

R. W. TURNER.