

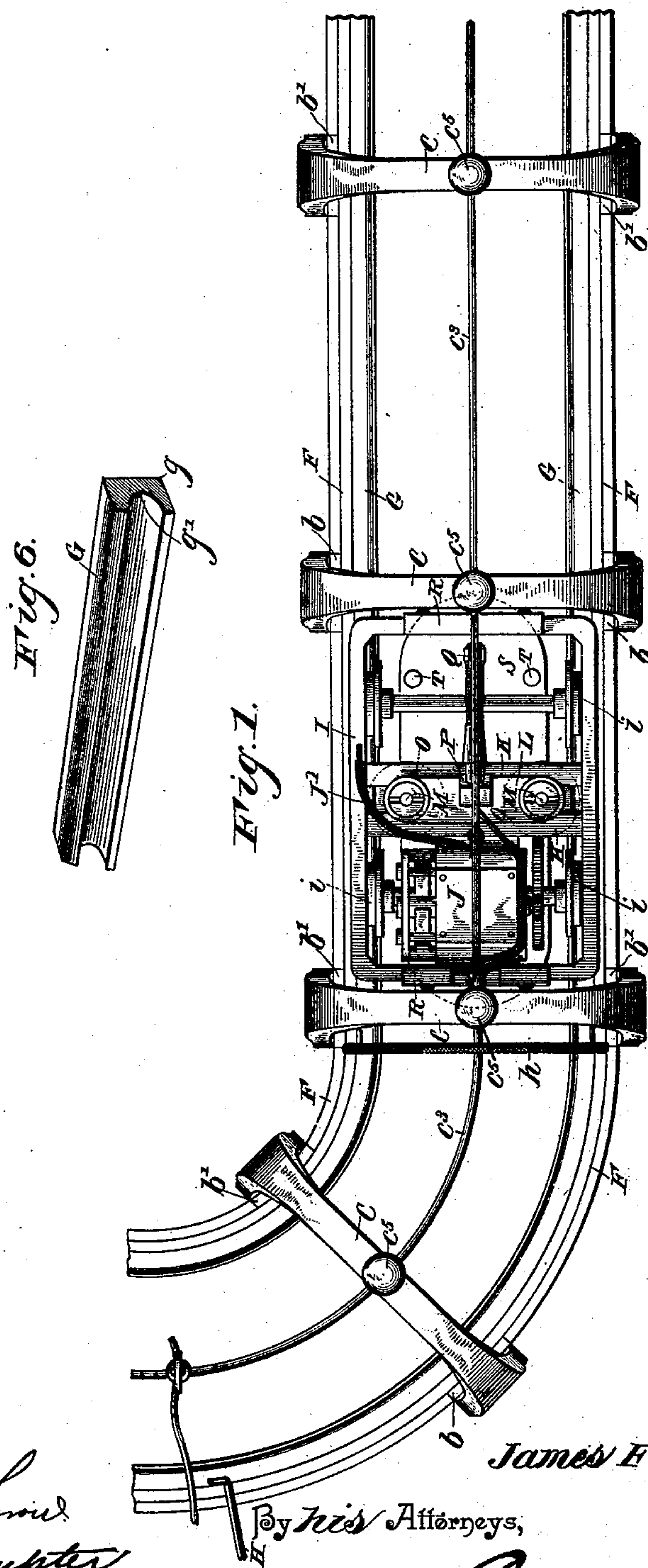
(No Model.)

4 Sheets—Sheet 1.

**J. F. CRANSTON.**  
**ELEVATED RAILWAY.**

No. 506,770.

Patented Oct. 17, 1893.



Witnesses;

J. M. Withers  
D. O. Wolhaupter.

Inventor,

*James F. Cranston,*

By *his* Attorneys,

CA Snow & Co.

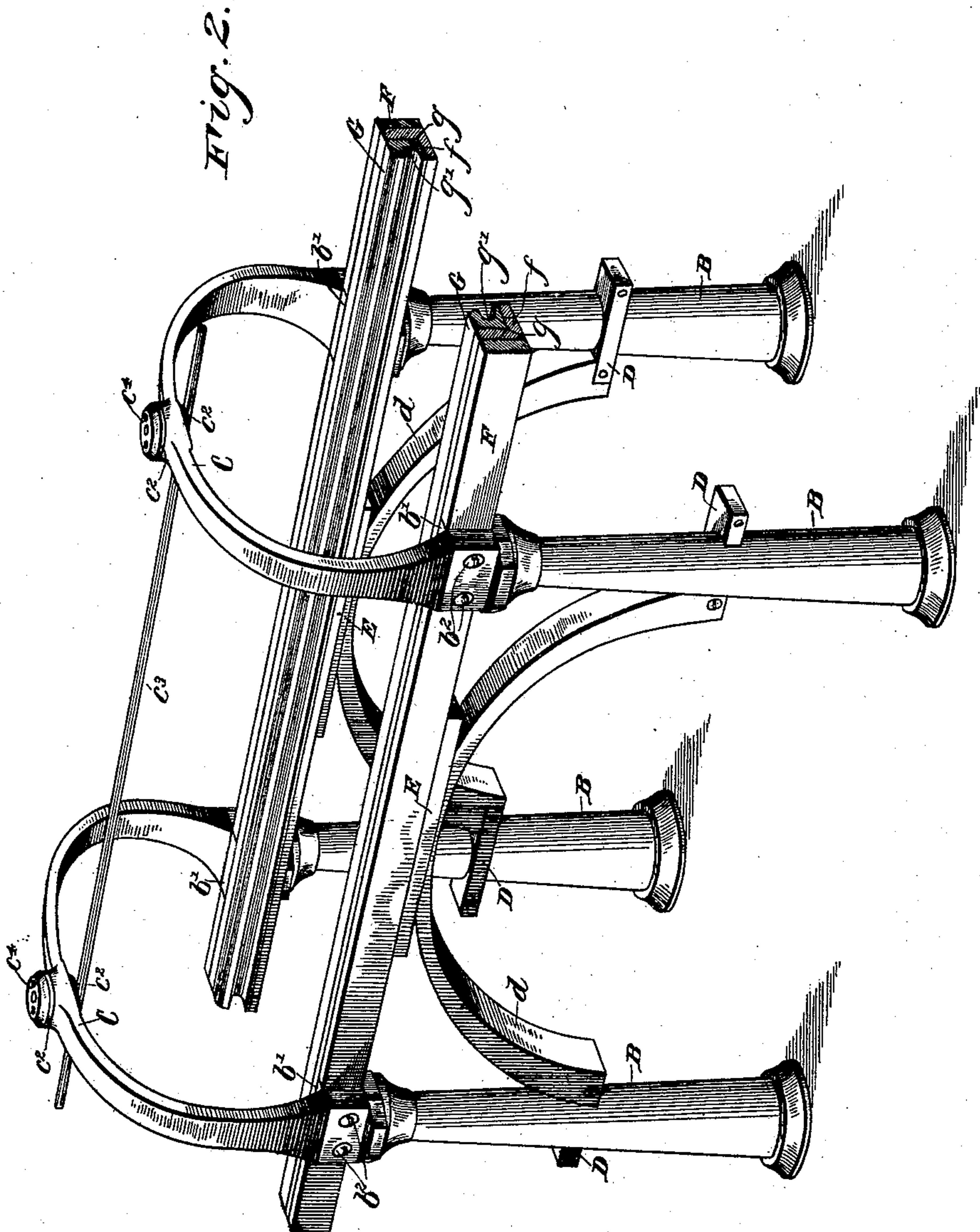
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J. F. CRANSTON.  
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Witnesses;

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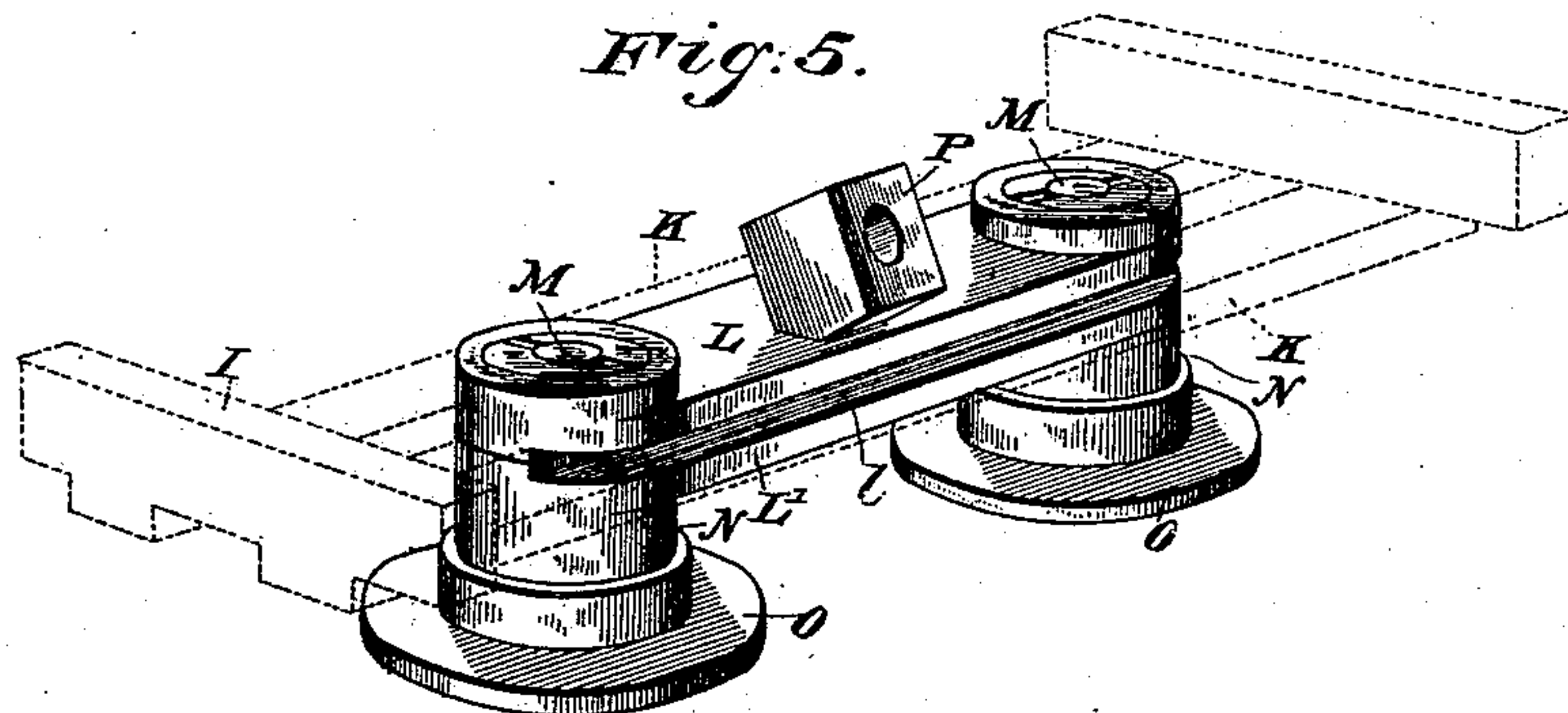
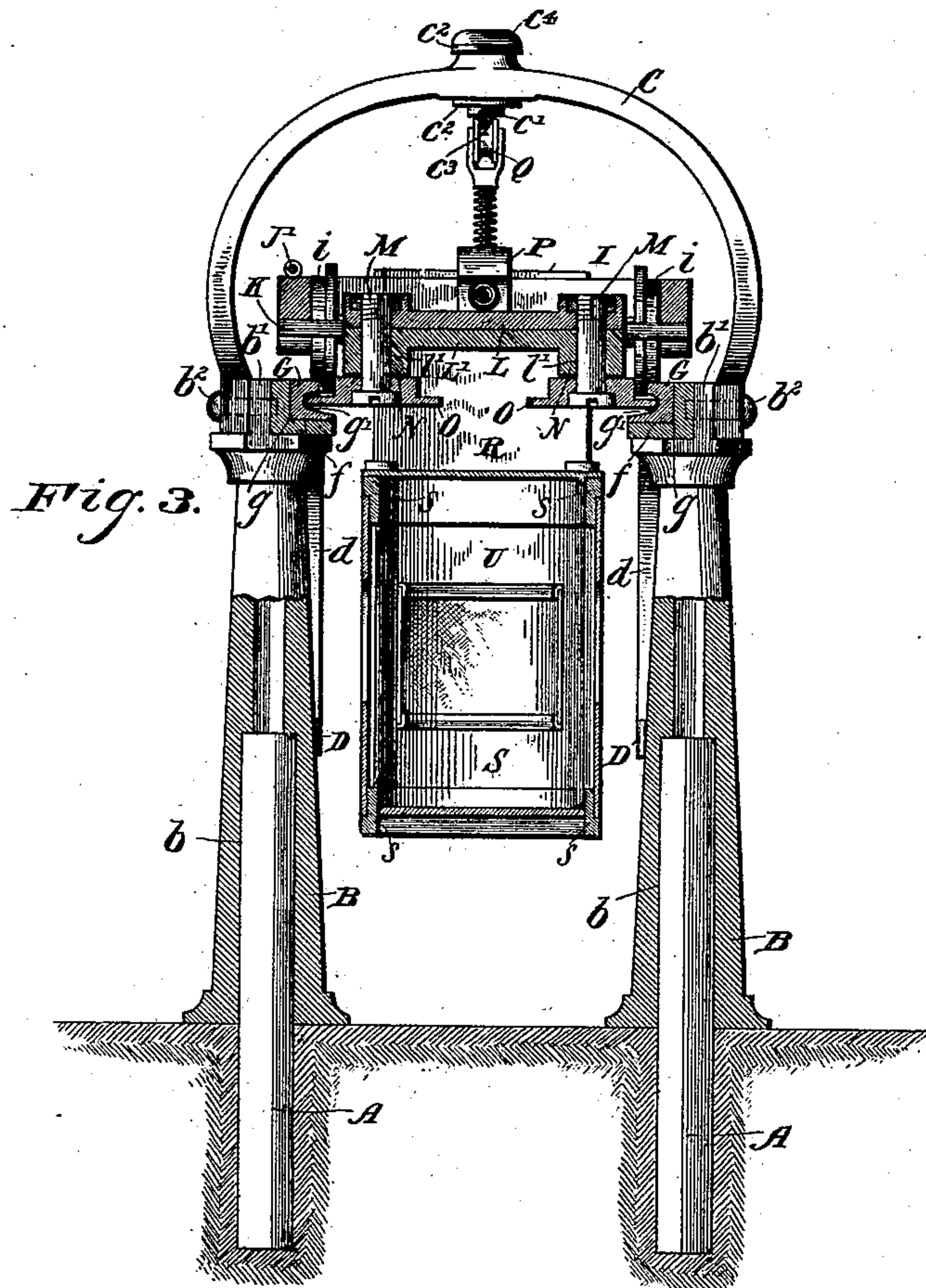
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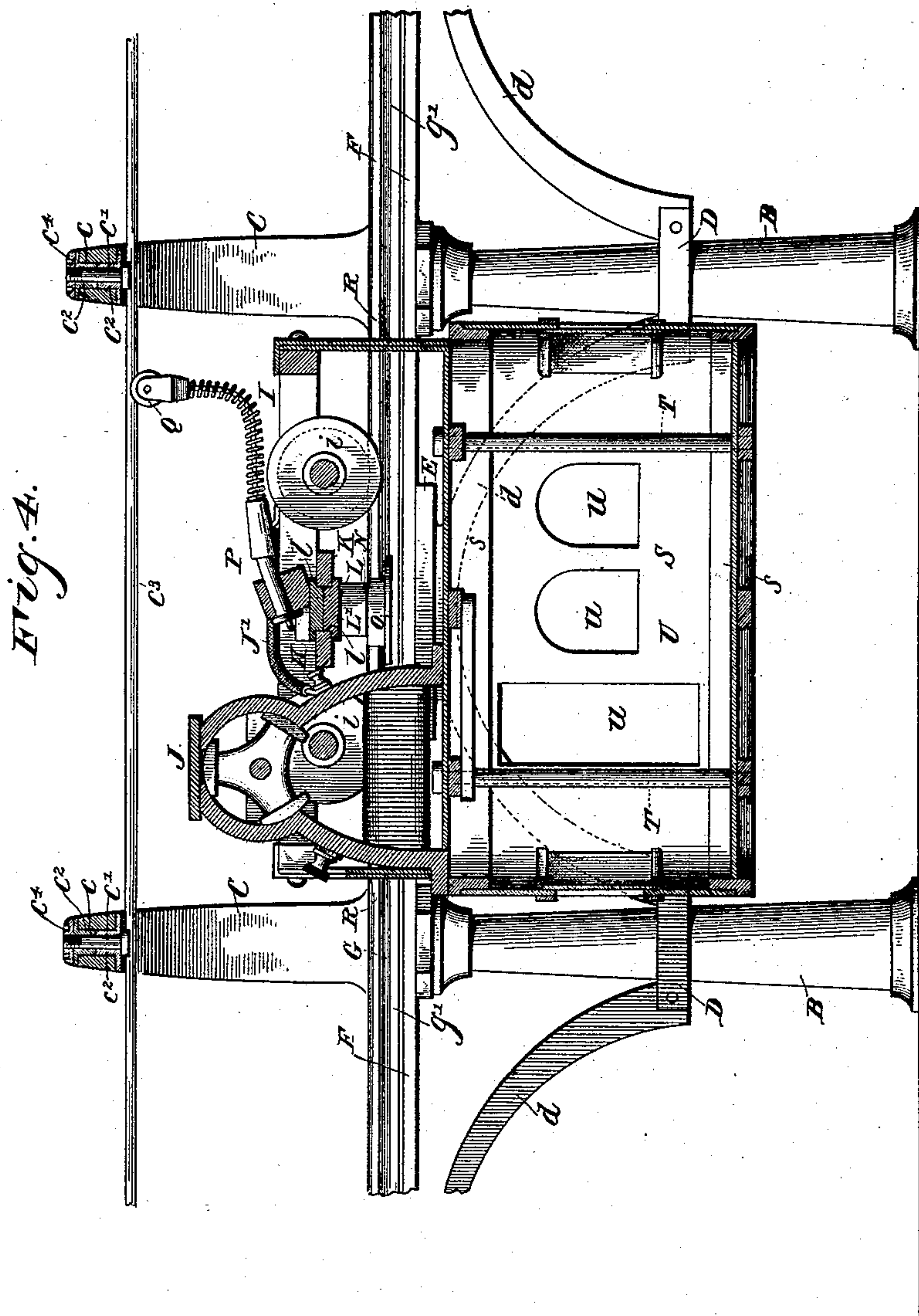
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4 Sheets—Sheet 4.

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Witnesses;

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# UNITED STATES PATENT OFFICE.

JAMES F. CRANSTON, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR OF  
ONE-HALF TO MICHAEL CRAVEN, OF SAME PLACE.

## ELEVATED RAILWAY.

SPECIFICATION forming part of Letters Patent No. 506,770, dated October 17, 1893.

Application filed May 23, 1892. Serial No. 434,006. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES F. CRANSTON, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Elevated Electric Railway, of which the following is a specification.

This invention relates to elevated electric railways; and it has for its object to provide an improved elevated electric railway system which is constructed with particular reference for rapid transit, and to this end is to provide a construction of railway and cars used in connection with said railway, which avoid any possibility of danger which is necessarily attendant with rapid transit systems, and particularly where the cars are mounted upon trucks traveling over surface roads. The system therefore contemplates important advantages in street railway travel and to provide for a rapid and effective system, while at the same time avoiding the swinging motion of a car while in rapid motion and therefore avoiding the possibility of danger.

With these and many other objects in view which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

Referring to the accompanying drawings;— Figure 1 is a plan view of a section of an electric railway constructed in accordance with this invention. Fig. 2 is a detail perspective of a portion of the railway. Fig. 3 is a vertical transverse sectional view of the railway. Fig. 4 is a vertical longitudinal sectional view of a section of the railway. Fig. 5 is a detail in perspective of the truck securing guide wheel frame. Fig. 6 is a detail in perspective of one of the rails.

Referring to the accompanying drawings:— A represents opposite anchoring spiles, driven into the ground opposite to each other in pairs equally spaced apart for anchoring the superstructure of the railway mounted thereon. Mounted over the said opposite spiles A are the opposite tubular track supporting pillars B, which pillars are provided with lower hollow recesses *b* taking over the portion of the spiles above the ground, and thus

providing means for supporting the pillars vertically above the ground. The said supporting pillars B are provided upon their flat upper ends with the central securing lugs *b'*, which form shoulders on each side thereof for securing the several portions of the railway thereto. Securely clamped to the securing lugs *b'* of each pair of supporting pillars B are the connecting bow-arches C. The said bow-arches C have their opposite ends rest upon the outer shoulders of said pillars, and are securely clamped to said securing lugs by means of the securing bolts or screws *b<sup>2</sup>* passing through said opposite ends of the arches, and said securing lugs. Said arches are further provided in the center thereof directly between the opposite pillars with the central openings *c*, through which pass the conductor supporting bolts *c'*. The said conductor supporting bolts *c'* are insulated from the top and bottom of said arches by the insulating collars *c<sup>2</sup>*, and suspend from their lower ends the continuous main conductor *c<sup>3</sup>*, which is connected with the generator of the system, and the upper ends of said bolts are engaged by the securing nuts *c<sup>4</sup>* to secure the conductor beneath said arches and directly over the center of the open track. A series of electric lamps *c<sup>5</sup>* may be mounted, and preferably are so, upon the top of the arches and connected with the conductor so as to provide means for illuminating the road at night. While the means for supporting the conductor have been specifically described, the same do not form the subject matter of a claim in the present application, but may be protected in a subsequent application. The said supporting pillars B are further provided on each side thereof with the opposite off-standing lugs D, to which are secured the opposite ends of the under intermediate strengthening arches *d*. The said strengthening arches *d* are connected with the lugs of the pillars of the adjacent pairs thus securely bracing all the pillars of each pair firmly together and strengthening the entire structure. The said strengthening arches *d* are provided between their ends and in line with the top of the pillars B, with the flat supporting flanges E to which are securely bolted the longitudinal track stringers F. The said track stringers F are



firmly supported by the opposite strengthening arches *d* and also are securely clamped to the opposite sides of the securing lugs *b'*, by means of the securing bolts or screws *b<sup>2</sup>* and rest upon the inner shoulders of said pillars, thus providing a firm and solid support for an open elevated railway. The said stringers *F* are provided upon their inner sides with the angular seats *f*, which receive the opposite rails *G* forming the elevated track of the railway. The said rails *G* have their inner sides facing the center of the track of the ordinary construction, while the outer sides of the same are constructed so as to be without the usual lower flange forming the base of the rail, and is provided with an angular corner *g*, which snugly fits in the rail seats *f* of the opposite stringers, and thus provide means for securely supporting the rails and effectually preventing the same from working loose, and also to prevent the rails from giving or yielding while under any side pressure from the car truck traveling thereover. The said rails as already stated are so arranged and constructed as to be provided with longitudinal grooves *g'*, between the tread of the rail and the lower base flange, so as to receive the truck securing and guide devices to be presently described. The car or truck traveling over the track completes the circuit from the main conductor through the track which is connected with the usual ground or return wire *H* connected with the track at the terminal of the road. The opposite tracks are connected in the same circuit by the wire *h* so that the return current can pass therefrom to the ground or return wire *H*.

Traveling upon the open elevated track just described and under the bow-arches and conducting wires supported thereunder, is the main rectangular car truck *I*. The said car truck *I* is mounted upon the ordinary wheels *i*, traveling over the opposite rails and supporting the truck thereon, and connected with one of the wheel axles is an electric motor *J* of any suitable type and, when the current is passed therethrough, is by means of suitable gearing adapted to drive the wheels mounted upon the axle connected with the said motor. Directly in front of the motor *J* and between the end wheel axles of the truck are located the parallel supporting guide plates *K*, which are adapted to support and receive the wheel frame or block *L*. The said block or plate *L* is provided with the opposite guide grooves *l* receiving the inner edges of said horizontal plates *K*, and providing means for not only supporting the said plate, but also allowing the same to slide back and forth from side to side between the inclosing frame of the truck. The said plate *L* is further provided at each end with the openings *l'*, which are adapted to receive the spindle bolts *M* passing therethrough and the under plate *L'*, correspondingly constructed to the upper plate and clamped thereto by means of

said bolts, so as to provide a supporting device securely clamped to the guide and supporting plates, while at the same time sliding therebetween. The under plate *L'* is provided with the downwardly projecting hubs or collars *M*, against the lower ends of which work the flanged guide and safety wheels *O* mounted to work over the lower ends of the spindle bolts *M*, and adapted to have the flanges thereof, travel in the inner longitudinal grooves *g'* of the opposite rails of the track. Now it will be readily seen that inasmuch as the flanges of said horizontal guide and safety wheels *O* always travel in the grooves of the opposite rails, it is impossible for the truck to leave the track no matter with what rapidity the same may be traveling, and that owing to the sliding supports for said wheels, when the truck is traveling around curves in the track and as illustrated at one end in Fig. 1 of the drawings, the said rollers still retain their hold in the grooves of the rails while the truck is projecting at one side over the inner rails of the track while going around the curve. The upper plate of the support of the guide and safety wheels is provided with a trolley block *P*, to which is connected the spring trolley *Q*, traveling over the conductor suspended over the center of the open track, and being connected with the sliding wheel supports, always engages the conductor while going around curves, inasmuch as the sliding wheel supports are always held in the same position between the rails and thereby always hold the trolley in position under the conductor. The trolley is connected by the ordinary electrical connections with the motor *J*, the return wire *J'* from which is connected with the metallic truck frame in circuit with the conducting rails of the track. Connected securely to each end of the truck and between the rails of the open track are the end supporting arms *R*, from which is suspended beneath the truck frame and below the track between the car way formed between the opposite pillars, the car *S*. The said car *S* is provided with the metallic top and bottom plates *s* between which is clamped by the tie bolts *T*, the car body *U*. The said car body *U* is of a width materially less than that of the truck from which the same is suspended, and is provided with the usual car windows and doors *u* for the ordinary purposes, the doors being to allow the passengers ingress to and egress from the car at the stations along the route.

It will be observed that inasmuch as the car suspended from the traveling truck is narrower than the truck itself, side motion or lateral swaying of the car is prevented which motion is usual in railway systems where the car is mounted upon a truck of smaller width than the same. Now it will be seen that the system and car used in connection therewith as herein described provides an electric railway particularly adapted for rapid travel.

The full power of the electric current may



be given to the motor of the truck to propel the truck at any speed desired, while at the same time no swinging or rocking is given to the car traveling through the car way below the truck, and also the danger of the truck leaving the track is avoided by means of the securing and guide wheels already described.

The many advantages of a system constructed in the manner contemplated by this invention will readily suggest themselves to those skilled in the art, and it is thought that the construction and operation of the same is at once apparent without further description.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an elevated electric railway, the combination with the elevated track and the conductor supported centrally thereover; of a motor car truck traveling upon said track and having stationary guides, a laterally movable trolley support arranged to slide between said guides on the truck, and the trolley connected to said support, substantially as set forth.

2. In an elevated electric railway, the combination with the opposite supporting pillars, the connecting arches secured to the upper ends of and connecting said opposite pillars, the opposite rails running under said arches and supported upon the upper ends of said pillars to form an open track, of the conductor suspended from said arches over the center of the open track, substantially as set forth.

3. In an elevated electric railway, the combination of the opposite anchoring spiles, hollow supporting pillars mounted over said spiles, bow-arches connecting the upper ends of the opposite pillars, strengthening arches connecting the adjacent pillars along both sides of the track, and the opposite rails supported on the upper ends of said pillars, and by the strengthening arches between the same to form an open track, substantially as set forth.

4. In an elevated electric railway, opposite anchored supporting pillars having securing lugs upon their upper ends, bow-arches connecting the opposite pillars and secured to said lugs, intermediate strengthening arches connecting the adjacent pillars, the longitudinal track stringers secured to said intermediate arches and the securing lugs at the upper ends of said supporting pillars, and the opposite rails seated in said stringers, to form an open track, substantially as set forth.

5. In an elevated electric railway, opposite anchoring spiles, hollow supporting pillars mounted over said spiles and provided with central securing lugs projecting from their flat upper ends, conductor supporting bow-arches resting upon the opposite pillars and secured to said securing lugs, intermediate strengthening arches having their ends connected to adjacent pillars and provided with flat supporting flanges in a line with the top of the pillars, longitudinal stringers secured

to said flat flanges and the securing lugs of the pillars and provided with angular seats, and the opposite rails having angular corners upon one side snugly fitting the angular seats of the stringers, substantially as set forth.

6. The combination of an elevated open track having a car way below said track, and the rails of which are provided with inner longitudinal grooves, a motor car truck traveling upon said track a sliding support arranged in said truck, and horizontal guide and securing rollers suspended from said sliding support and engaging the side grooves in the rails, and a car suspended from the truck in the carway, substantially as set forth.

7. The combination of an elevated open track having a car way below said track and the rails of which are provided with inner side grooves facing the car way, the connecting arches supporting the main conductor and spanning the track, a motor truck traveling upon said track and having horizontal flanged guide and safety wheels traveling in the side grooves of the rails, and a car suspended from said truck in the carway, substantially as set forth.

8. In an elevated electric railway, an elevated open track the rails of which are provided with inner side grooves, a motor truck traveling upon said track and having supporting guide plates, a sliding support mounted to slide over said plates, horizontal guide and safety wheels suspended from said support and traveling in the side grooves of the rail, and a car suspended from said truck, substantially as set forth.

9. In an elevated electric railway, the opposite elevated rails forming an open track and provided with inner side grooves, a motor truck traveling upon said track and having transverse supporting guide plates, a sliding wheel support mounted upon said guide plates, horizontal flanged guide and safety wheels suspended from opposite ends of said support and traveling in the side grooves of the rail, the motor mounted upon said truck, the conductor arranged above the track, the trolley connected to said sliding support and with the motor, and the car suspended from said truck, substantially as set forth.

10. In an elevated electric railway, the opposite elevated rails forming an open track and provided with inner side grooves, a motor truck traveling upon said track and having parallel supporting guide plates, a sliding support comprising upper and lower plates having perforated ends and opposite side grooves engaging the inner edges of said parallel plates, the lower plate being further provided with depending hubs or collars, spindle bolts clamping said plates together and to said guide plates, horizontal flanged guide and safety wheels mounted upon the lower ends of said spindle bolts against said collars, and traveling in the side grooves of the rails, substantially as set forth.



11. The combination of an elevated open track, having a carway below said track, a motor truck traveling upon said track, opposite supporting arms secured to opposite ends  
5 of said truck and a car of smaller diameter than the truck suspended from said end arms below the truck in the car way, and comprising upper and lower top and bottom plates, a car body between said plates and tie-bolts

clamping said car body between the upper and lower plates, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES F. CRANSTON.

Witnesses:

H. C. MOSELEY,  
E. H. BROWN.