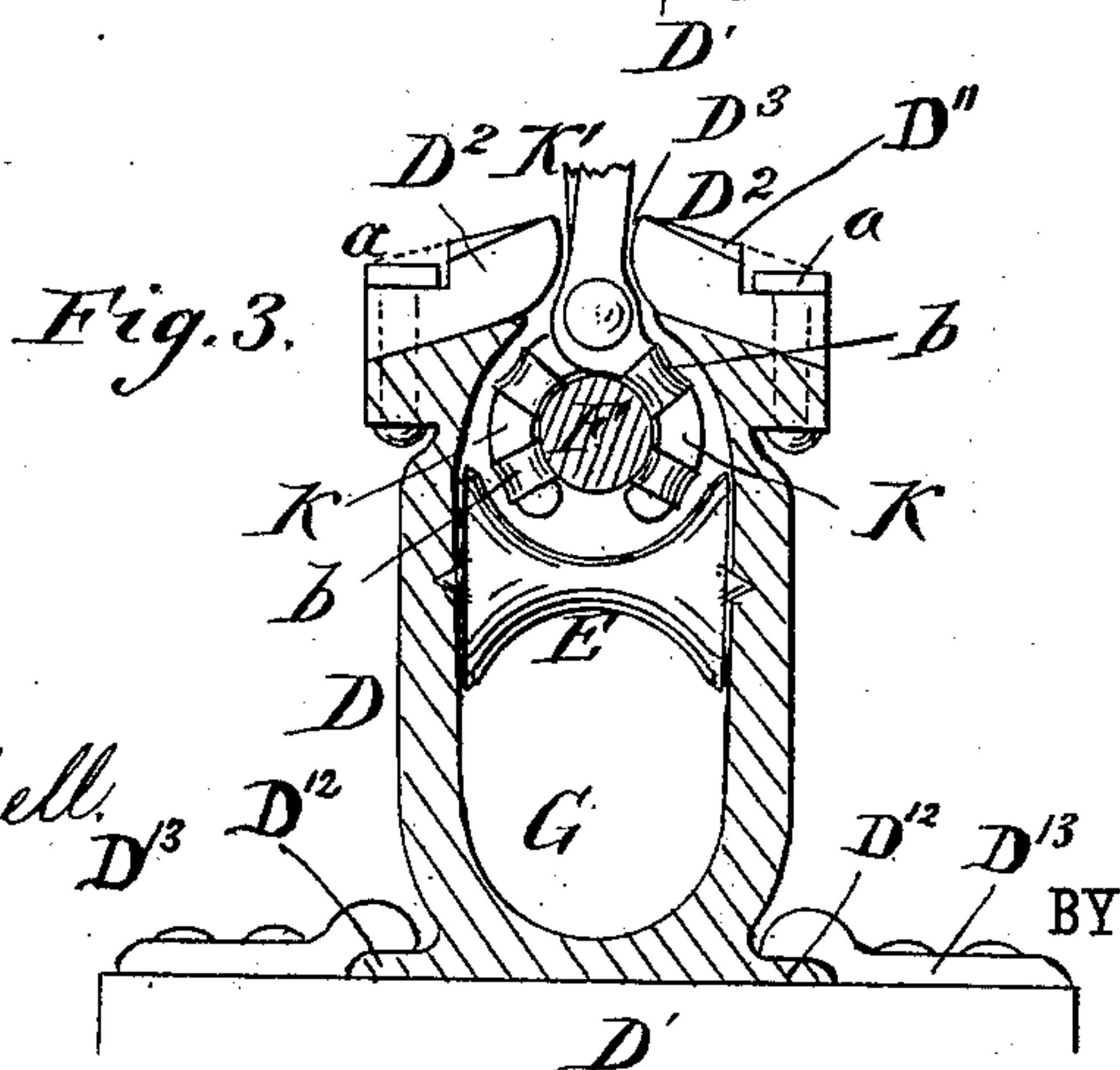
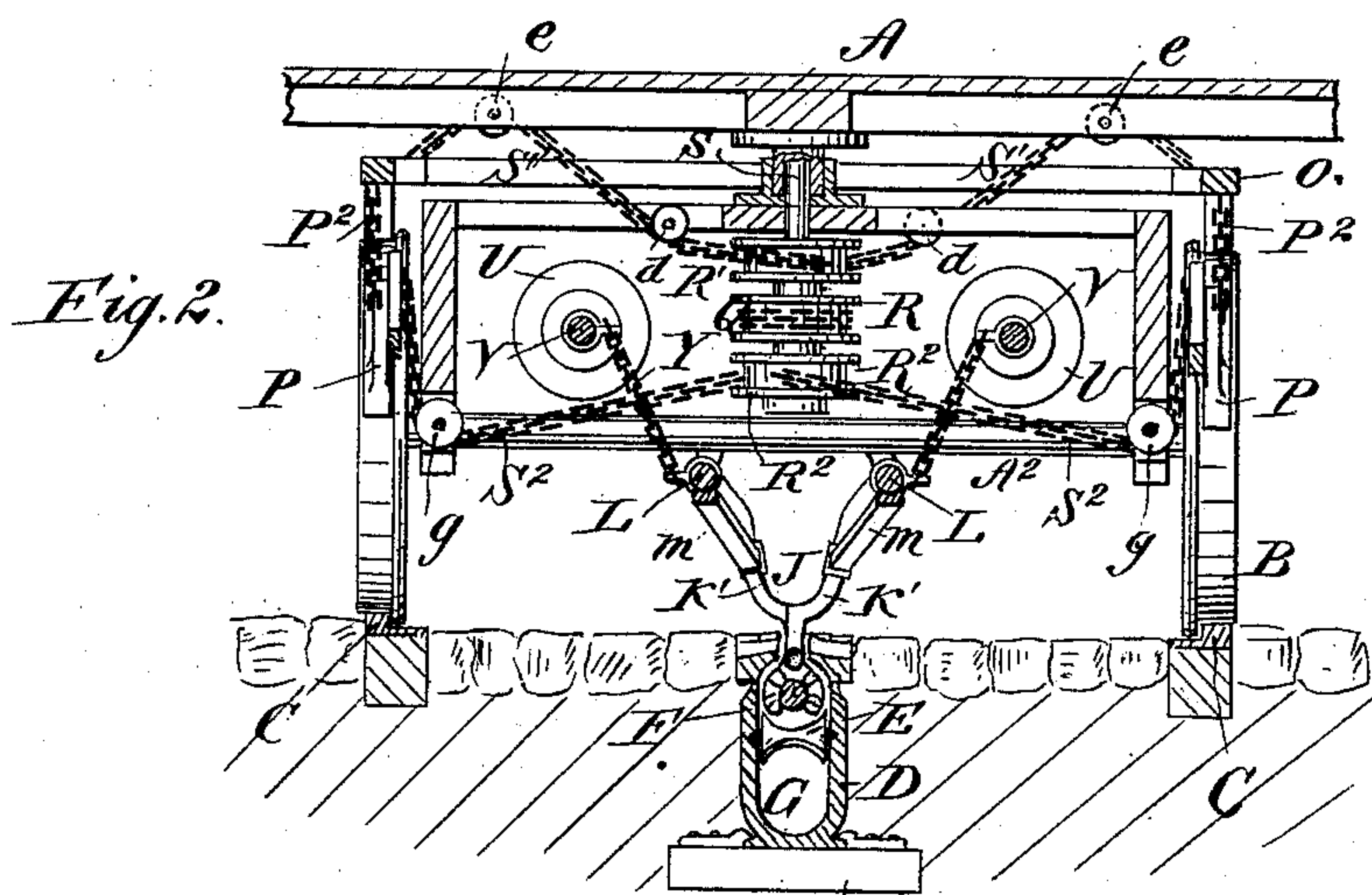
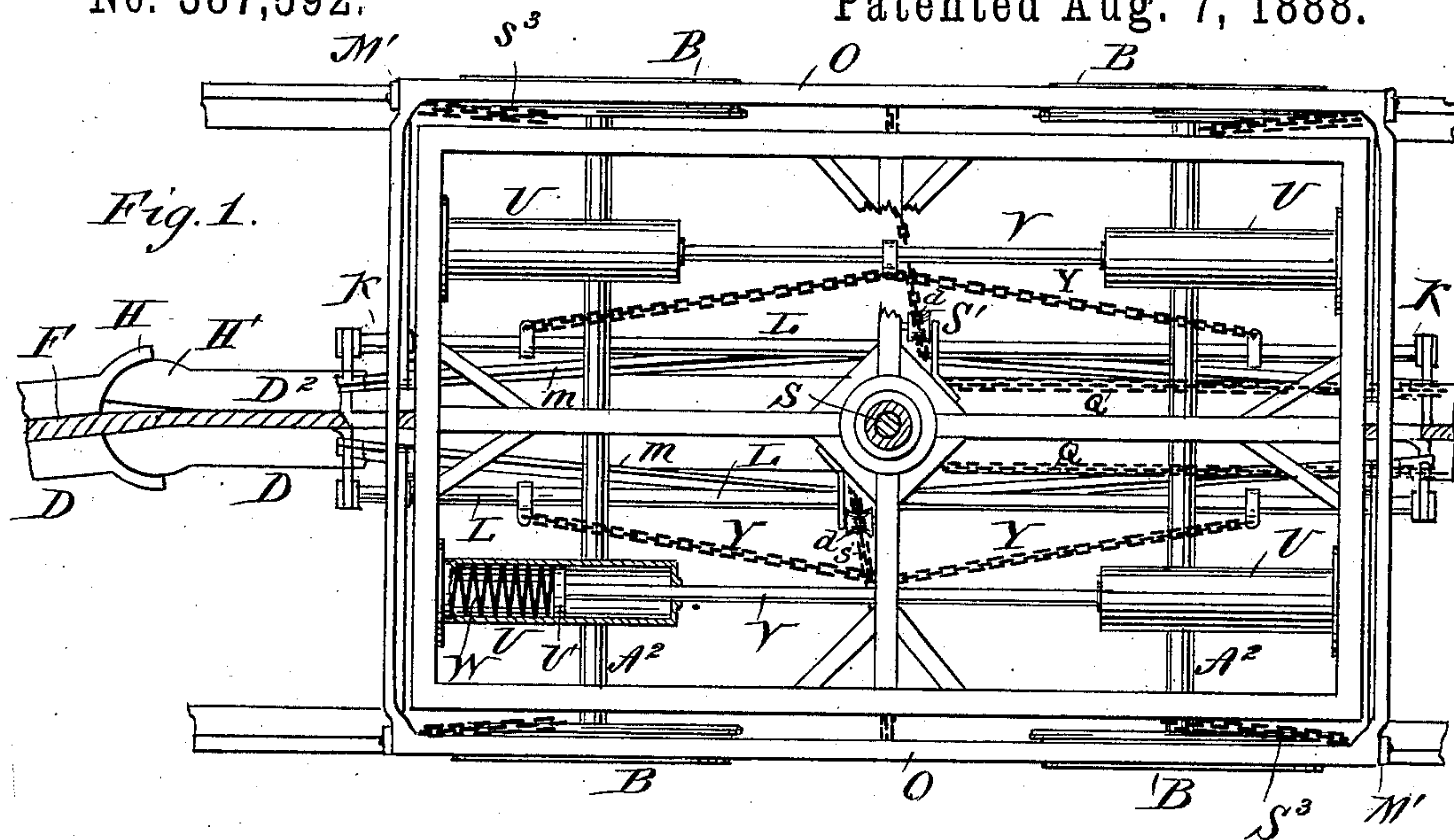


J. P. HUNT.
TRACTION CABLE RAILWAY.

No. 387,592.

Patented Aug. 7, 1888.



WITNESSES:

Donn Twitchell.
C. Sedgwick.

INVENTOR:

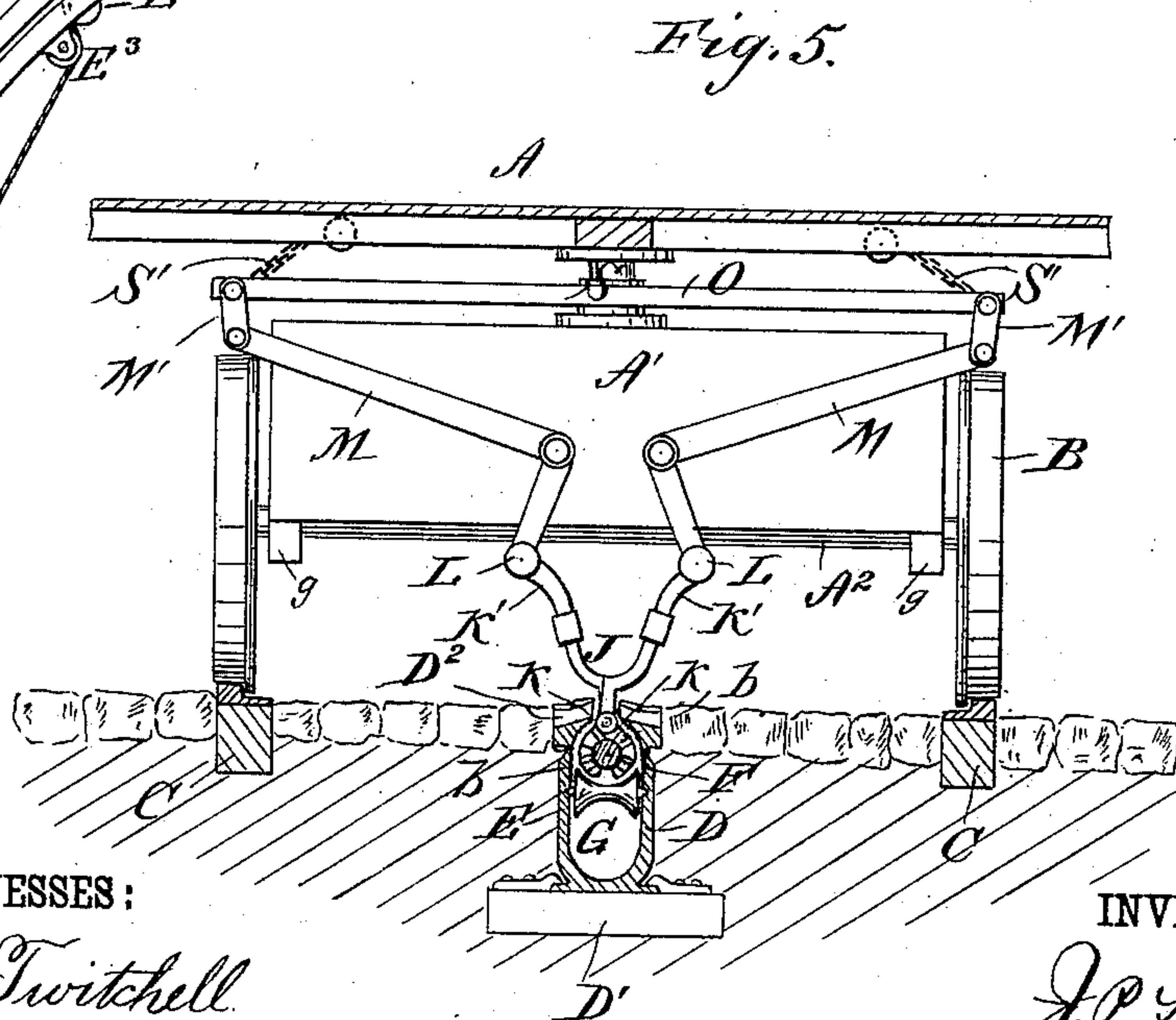
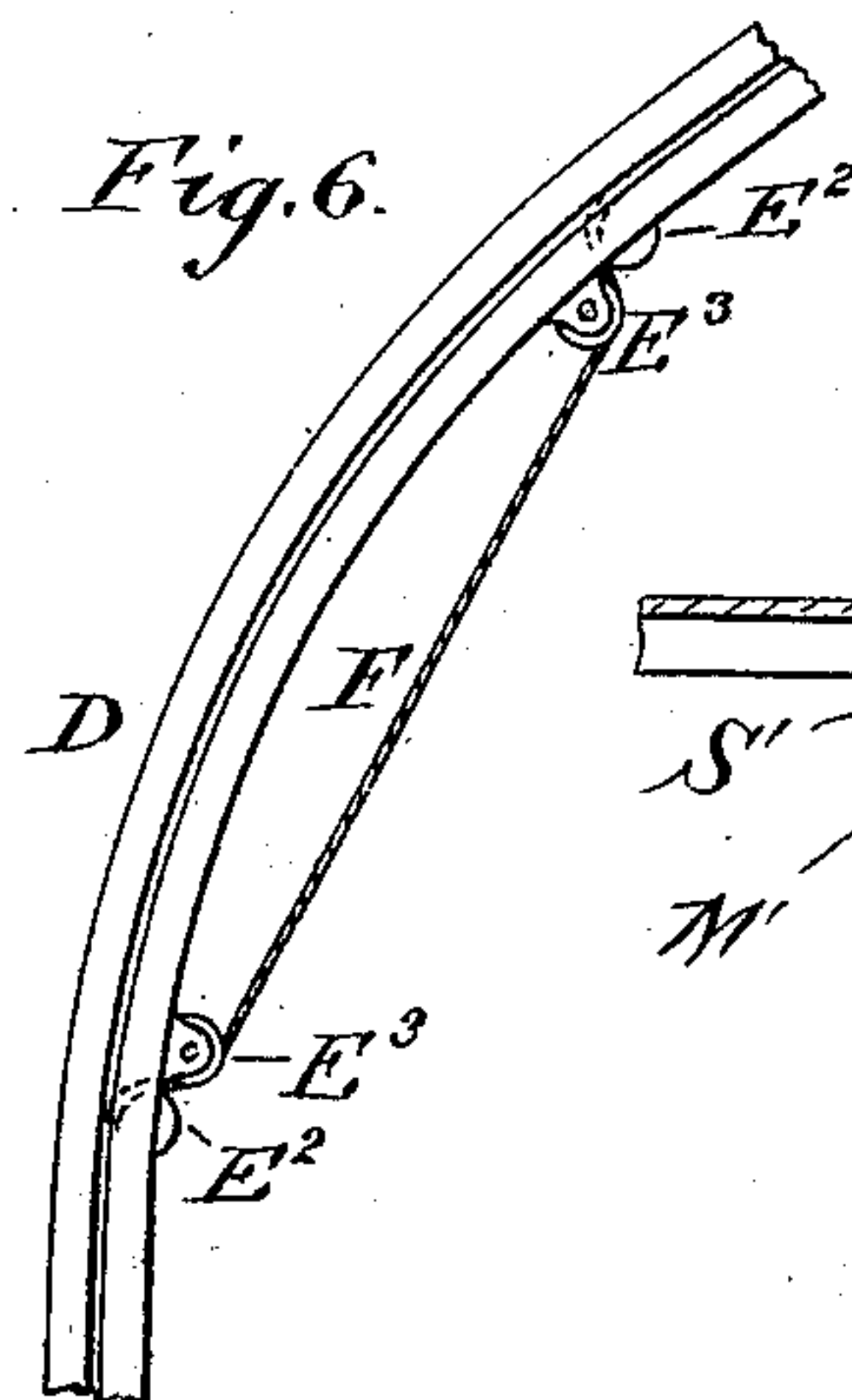
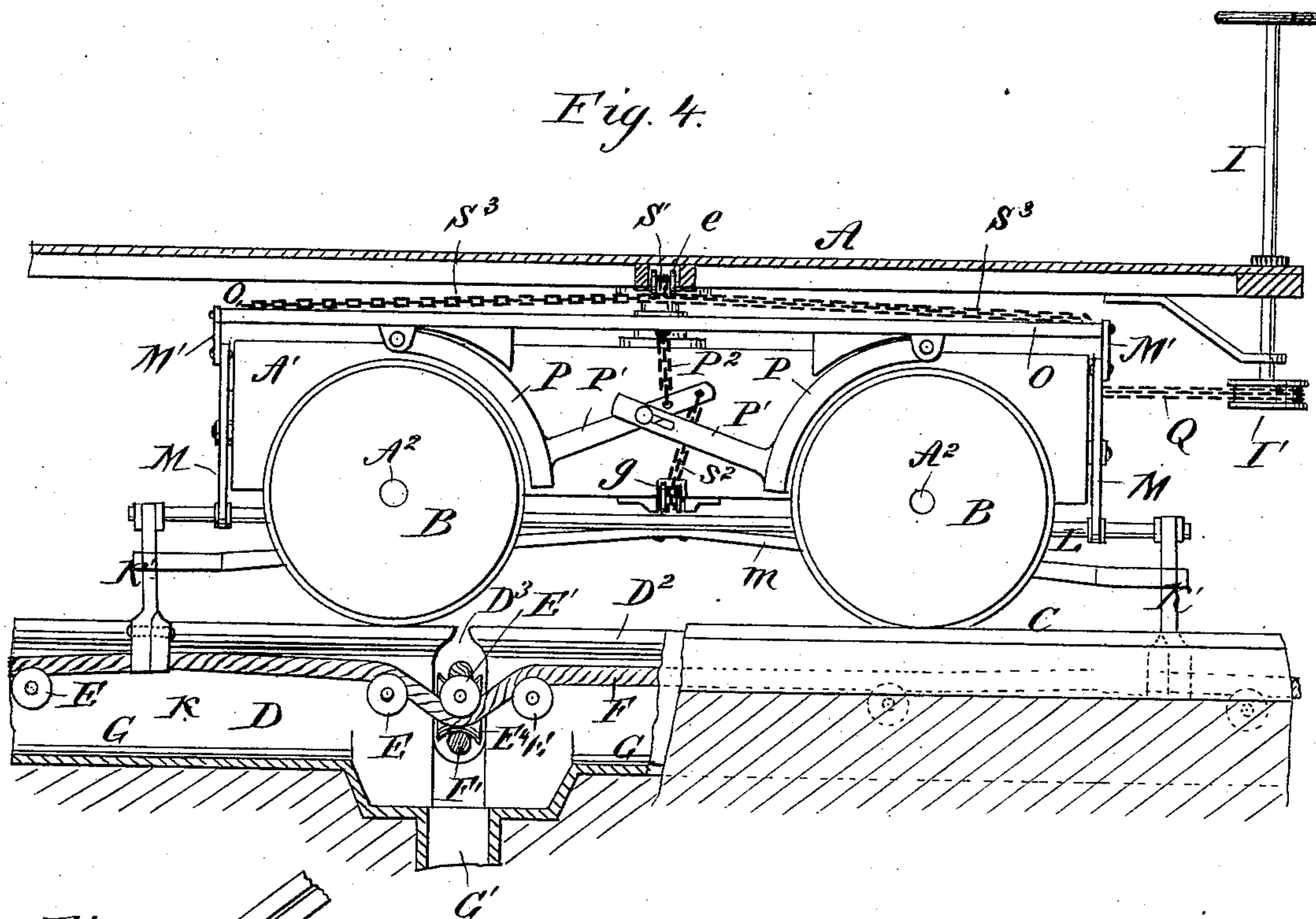
J. P. Hunt.
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INVENTOR:

BY *J. P. Hunt,*
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ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN P. HUNT, OF PHILADELPHIA, PENNSYLVANIA.

TRACTION-CABLE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 387,592, dated August 7, 1888.

Application filed September 2, 1882. Serial No. 70,890. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. HUNT, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Cable Traction Railway, of which the following is a full, clear, and exact description.

My invention has relation to cable traction railways; and it has for its object simplicity, durability, and effective working of parts necessary for the equipment of a system of railways, whereby the cost of construction is materially cheapened, the expense of running and maintenance reduced, the cars readily and easily stopped and started without vibrating, jarring, or other annoying and dangerous motions, and the crossing lines of cables arranged to pass each other without interference.

My invention accordingly consists of the novel construction, combination, and arrangement of parts, as hereinafter described and claimed, reference being had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents a plan of the car and part of the trackway of my improved cable traction railway, parts of same being broken out and others shown in section; Fig. 2, a cross-sectional elevation of same; Fig. 3, a cross-section of the cable-conduit; Fig. 4, a longitudinal sectional elevation of the car and part of the trackway, parts of the same being broken out and others shown in section; Fig. 5, an end view of the car and a cross-sectional elevation of the track and cable, and Fig. 6 a plan of the conduit and cable at a curve.

The platform A of the car rests on a truck, A', in which the axles A² are journaled, and have wheels B for running upon the track-rails C, all of which are constructed and arranged for operation in the usual or other desired manner.

Between the rails C a longitudinal trough-shaped box or conduit, D, is placed, the top of which is preferably level with the surface of the road-bed. The sections of the conduit are preferably secured to the sleepers D' by suitable clips or other fastenings, D¹³, driven into the cross-ties and engaging with side flanges or lugs, D¹², at the bottom of the conduit-sections. The conduit has in its top a

central longitudinal slot extending throughout its length, and from the slot outwardly the top of the conduit preferably inclines downwardly toward its sides, as shown. The slot in the top of the conduit proper is formed between the adjacent edges of inside flanges projecting from the top of the sides of the conduit, as illustrated, or, in other words, the sides of the conduit at their upper extremities approach each other to form the edges of the slot in the conduit-sections. Upon the top of the conduit-sections are top plates, D², having corrugations or recesses D¹¹ formed in their upper surfaces for preventing the slipping of horses traveling over the same, and also having countersunk bolt-holes for bolts a, for fastening said plates D² to the conduit-sections, so as to be removable therefrom. The top plates, D², form a narrower slot, D³, between them than that in the top of the conduit proper, as illustrated. The sides of the slot D³ are preferably made rounding, and it is wider at its top than at its bottom, as shown, to admit of greater lateral inclination and movement of the grip or clutch-iron while traveling along in the slot. These plates D² are used to avoid wear or damage to the top of the conduit-section proper by the travel of horses attached to other vehicles, and are made removable, so that they can when worn be replaced by other plates without necessitating taking up of any of the conduit-sections. Concave rollers or carrying or bearing pulleys E, having preferably one or more conical journals, are mounted in correspondingly-shaped bearings in any suitable manner in the conduit for supporting the traveling cable F.

Between the rollers or pulleys E and the bottom of the channels a gutter or drainage-channel, G, is formed, through which the water that flows in through the top slot is conducted to some suitable pipe which leads to a waste-pipe or sewer. If two conduits D cross each other, both cables are preferably depressed, one passing under the other, in order to allow the clutch or grip to be disengaged from the cable and pass the crossing, and for this purpose I have provided a roller or pulley, E, at each side of the under cable, F', and one roller or pulley, E', above the said under cable, the longitudinal axis of which is parallel with that of the under cable, F'.

The cable F is passed over the rollers or pulleys E and under the roller or pulley E'. In like manner the under cable, F', is preferably passed over a roller or pulley, E, at each side of the cable F and under a roller or pulley, E', so that the said cable F' passes under the cable F, and the two cables cross each other without interference and without inducing undue friction between them and the depression-pulleys.

At the intersections of the crossing conduits D, I provide a pipe, G', to conduct the water from conduit-drainage channel or pipe to the gutter or sewer.

To facilitate forming curves or bends in the line of the conduit, I may provide one end of each conduit-section with a socket, H, and the other end of each section with a ball, H', so that the sections can easily be adjusted to have any desired inclination to each other in a horizontal plane; but they may be otherwise constructed as desired.

The cables are operated from some fixed station, as is customary in cable railways. I prefer to use two clutches or grips, one at each end of the car, and by so doing I am enabled to pass over crossing lines of cable railways without depending upon the momentum of the car. The clutch or grip J is formed of two jaws, K K, provided with extensions or arms K' K' integral therewith, which jaws are pivoted to each other within the conduit between its top and the cable, as shown in Figs. 2 and 4, so as to bring the pivot points or fulcrum of the jaws in as close proximity to the upper surface of the cable as possible to admit of obtaining a powerful gripping engagement with the cable by a slight movement of the arms K' K', and also to bring both the cable and jaws as near to the top of the conduit as is desirable to admit of using a narrow slot in the conduit, and a shallow depth of conduit capable of resting upon the sleepers and being secured thereto, as above described, for reducing the size and cost of the conduit; but said grip-jaws may be otherwise pivoted together as desired.

The arms K' of jaws K are preferably attached to the lower ends of angle-levers M pivoted to the truck, which have their upper ends preferably connected by links m' with a frame, O, to the side bars of which the upper ends of the curved or other brake-shoes P are pivoted.

If desired, the upper ends of the angle-levers M can be connected directly with the ends of the brake-frame O.

The jaws K are provided with anti-friction rollers b b, if desired, to prevent undue chafing and rapid destruction of the cables.

On one or both ends of the platform a vertical brake-shaft, I, is journaled, which is shown provided at its lower end with a drum, I', around which passes a chain, Q, which also passes around a drum, R, mounted on a vertical shaft, S, projecting downwardly from the bottom of the car-floor and suitably journaled in the truck.

Above the drum R the drum R' is shown mounted on the vertical shaft S, and below the drum R a drum, R², is shown mounted upon the same shaft, S. To drum R' chains S' are attached, which run over pulleys d in the truck A' and pulleys e on the car-bottom A', and are then attached to the middle of the length of the chains S³, the ends of which are attached to the frame O. Chains P² connect the side bars of the frame O with one of the arms P' of the brake-shoes P, which arms P' are pivoted together.

The chains S² are attached to drum R² and pass over pulleys Y, journaled in the bottom of the truck, and are then attached to one of the arms P' of the brake-shoes P. Horizontal rods V are mounted upon the truck, and are provided at their opposite ends with pistons U', which fit in cylinders U, held horizontally within the truck-frame at the ends. The said cylinders preferably contain air only. When air is employed, the spring is made either by a vacuum or a compression, or both. Chains Y connect the said rods V at the middle with the ends of the bars or rods L, to which the arms K' of the clutches or grips are pivoted. The arms K' of the clutches are connected by means of brace-bars m with rods or bars L.

At curves the cable F passes between pulleys E² E³ and forms a chord of the segment of the conduit-channel, as shown in Fig. 6. The said rollers are journaled or pivoted in a horizontal plane. The pulleys E² turn the cable outward from the conduit-channel, and the pulleys E³ prevent it from being cut by the edges of the openings in the conduit-channel. Pulleys are also used to keep the cable in place at low grades.

The operation is as follows: The jaws of the grip or clutch J are within the conduit D and at the sides of the cable which rest on the rollers E. If the car is to be propelled, the clutches or grip must grasp the cable. To accomplish this the gripman on the car turns the shaft I in such a manner that the chains S' wind up on the drum R' and the chains S² unwind from the drum R². As the chains S' are wound on the drum R' the frame O is raised, whereupon the brake-shoes are raised from the car-wheels and the brakes released, and at the same time when the frame O is thus raised the upper ends of the angle-arms M are also raised, the bars L moved toward the sides of the car, and the jaws K moved in the converse direction—that is, toward the cable F, which they firmly clutch, and the car is then drawn along by the cable. To stop the car or check its speed, the shaft I is turned in such manner that the chains S' unwind from the drum R' and the chains S² wind on the drum R². As the chains S² are wound on the drum R², the ends of the pivoted arms P' of the brake-shoes are moved downwardly, one of the arms P' being slotted to permit of the movement therein of the pivot by which the two arms are pivoted together and the brake-shoes are pressed against the

wheels. At the same time the chains P^2 draw the frame O downwardly, pressing the outer ends of the angle-arms M downward, thereby pressing the rods L toward each other, and in turn moving the jaws of the clutches or grips away from each other to release the cable. The brake-shoes are applied and the car released from the cable at the same time and the cars stop very quickly. When the clutch or grip arrives at a crossing line of cable, it is to be released from the cable until it travels beyond said crossing line, when it is again caused to engage with the cable. The grip is released from the cable at the crossing by repeating the operation that releases it to stop the car.

If the clutches or grips are suddenly applied the car receives a shock, and to counteract this shock I provide the rods V, the pistons U', the cylinder U, and the springs W, which rods V are connected with the rods L, which have a slight longitudinal movement by the chains Y.

If the cable is suddenly engaged by the grips or clutches the strain of the same falls on the rods L, which then move longitudinally, and by means of the chains Y the rods V are drawn in the direction of the run of the cable, whereby the rod V is pressed into the forward cylinder, U, to compress the spring or air in the same and thereby relieve or counteract the strain and shock incident to too sudden starting of the car.

It is evident that the details of construction and arrangement of parts herein described may be greatly varied without departing from the spirit of my invention, and I therefore do not confine myself to the particular construction and arrangement shown and described for said parts except when such specific construction constitutes the only novel feature of my improvements.

What I claim is—

1. In a cable railway, the combination, with a car, of a frame, brake-levers pivoted to the same, pivoted angle-levers, a clutch or grip connected to said levers, and means for raising and lowering the frame, substantially set forth.

2. In a cable railway, the clutch or grip J, formed by the pivoted jaws K, attached to the arms K', connected with the pivoted angle-levers M, which are operated from the car, as and for the purpose set forth.

3. In a cable railway, the combination, with the clutch or grip jaws K, of anti-friction rollers b, mounted on the same, for the purpose set forth.

4. In a cable railway, the combination, with the clutch or grip J, of the arms K', rods L, the pivoted angle levers M, and the frame O, carrying the brake-shoes P, substantially as and for the purpose set forth.

5. In a cable railway, the combination, with the frame O and the brake-shoes P, pivoted to said frame, of a cable clutching or gripping device pivoted to the same frame, substantially as set forth.

6. In a cable railway, the combination, with the frame O, of the brake-shoes P, the pivoted

angle-levers M, the arms K', the clutch or grip J, the chains S' and S², and the shaft S, provided with the drums R' and R², and the chains P², substantially as herein shown and described.

7. In a cable-railway car, the combination, with the clutch or grip J, of the rods L, the chains Y, the rods V, the cylinders U, piston U', and the springs W, substantially as and for the purpose set forth.

8. In a cable railway, the combination, with the curved channel D, of the cable F and the anti-friction rollers or pulleys E² and E³, substantially as and for the purpose set forth.

9. In a cable railway, the combination, with the trough-shaped channel D, having its top inclined from the center outward, and provided with a longitudinal slot, D³, in the top, of the top plates, D², substantially as set forth.

10. In a cable railway, the two channel-sections D, one provided with a ball end, H', and the other with a socket end, H, combined with each other, substantially as set forth.

11. In a cable railway, the combination, with the channel D, of the rollers E E' E², all constructed and arranged substantially as herein shown and described, whereby the cables are depressed at a crossing and one made to pass beneath the other, as set forth.

12. In a cable railway, a car having brake-shoes provided with toggle-jointed levers, a clutch or grip for the cable, and actuating mechanism for the toggle-jointed levers of the brake and for the clutch or grip, substantially as set forth.

13. In a cable railway, a car having a vertically-moving frame, O, brake-shoes P, secured to said frame, and having toggle-levers P', in combination with actuating mechanism for the brake-shoes and frame, substantially as set forth.

14. A cable-motor car having a grip and actuating mechanism therefor, and brake-shoes having toggle-jointed levers, frame O, and actuating mechanism, substantially as set forth.

15. In a cable-motor car, a windlass or drum, R, R', and R², or equivalent, secured to the car and having chain-connection with the brake-shoes and the grip or grips of the car, substantially as and for the purpose set forth.

16. In a cable railway, a depression roller or pulley, E', as and for the purpose set forth.

17. In a cable railway, a depression or deflecting roller or pulley, as and for the purpose set forth.

18. The combination, with crossing lines of a cable-motor-railway system, of a depression pulley or pulleys for one of the cables of the crossing lines, substantially as set forth.

19. The combination, with crossing lines of a cable-motor-railway system, of depression rollers or pulleys at the crossing lines for depressing one or more cables, as set forth.

20. In a cable railway, the combination of a line of car-tracks, a slotted conduit, D, located between the tracks and resting upon the

sleepers D', and bent plate-clips, one end of each of which engages with the conduit and the other is bolted to sleepers D', for holding the conduit in position upon said sleepers, substantially as set forth.

21. In a cable-motor railway, a slotted conduit located between the tracks and having at its top inside edge flanges or projections and detachable top plates upon said projections, which plates extend along the entire length of the conduit, substantially as set forth.

22. A cable-railway conduit having at its top inside edge flanges or projections and detachable top plates, substantially as and for the purpose set forth.

23. A cable-railway conduit having at its top inside edge flanges or projections and separate and detachable top plates, substantially as set forth.

24. In a cable-motor car, the combination of a clutch or grip, J, longitudinally-sliding rods L, connecting mechanism between the clutch-jaws and rods, and actuating mechanism for the rods, substantially as set forth.

25. In a cable-motor car, a pair of clutch or grip jaws, K K, pivoted to one another, and each jaw having connection with longitudinally-sliding rods L, and mechanism for actuating said rods, substantially as set forth.

26. In a cable-motor car, longitudinally-sliding rods L and two grip attachments in connection with and operated by said rods, substantially as set forth.

27. A cable-motor car having two grips operated to simultaneously act upon the cable, separate or independent arms or supporting-bars for each grip, and one grip being in advance of the other, as and for the purpose set forth.

28. The combination, with a conduit having a channel, D, of a cable-motor car having a grip, J, formed of two jaws, K K, pivoted to each other at their upper ends within the channel D, substantially as set forth.

29. The combination, with a conduit having a channel, D, of a cable-motor car having a grip, J, formed of two jaws, K K, pivoted to each other at their upper ends within the channel D and curved in the direction of the cable, substantially as set forth.

30. The combination, with a conduit having a channel, D, of a car having a grip, J, the jaws K K being pivoted to one another immediately above the cable and below the conduit-slot, substantially as set forth.

31. In a cable-motor railway, a car having a grip, J, comprising the jaws K K, pivoted at their upper ends, and the vertical arms K' K', so constructed as to permit its easy movement in the slot of a conduit one inch or less in width, substantially as set forth.

32. A cable-motor car having two separate grips operated to simultaneously act upon the cable, in combination with suitable mountings, whereby they may have a sliding movement in the direction of the length of the car

when acting upon the cable, substantially as set forth.

33. In a cable railway, the combination, with longitudinally-sliding rods and grip-jaws secured to said rods, of cylinders and rods provided with pistons at their ends working in said cylinders and connected to said sliding rods, substantially as set forth.

34. The combination, in a cable motor railway, of a slotted conduit, a car having a clutch or grip attachment with one or more cylinders closed at both ends, and one or more plungers or pistons for preventing the jolting or shocks incident to starting the car, substantially as set forth.

35. In a cable-motor car, the combination of a grip attachment with the horizontal rod V, having two pistons or plungers, U', and cylinders U, substantially as set forth.

36. In a cable railway, a car having two independent or separated grips, one in advance of the other, brake shoes for the car-wheels, and actuating mechanism for applying the brakes when the grips are released or out of action and for releasing the brakes when the clutches are in action.

37. In a cable railway, the combination of a car having two grips separate from one another and a conduit having depression rollers E E E', as and for the purpose set forth.

38. In a cable railway, a car having brake-shoes, a grip, actuating mechanism for said shoes and grip, and a cylinder with pistons connected to the grip-actuating mechanism, as and for the purpose set forth.

39. In a cable-motor railway, the combination of a slotted conduit, a smooth cable, supporting-pulleys for the cable journaled in said conduit, a car having a grip supported independently of the car-body, jaws on said grip having pivoted bearings or supports above the cable and below the conduit slot, and actuating mechanism supported upon the car-body for positively regulating the degree of clamping-pressure of the jaws upon the cable and for releasing them therefrom, substantially as set forth.

40. In a cable-motor railway, the combination, with a smooth cable having supporting-pulleys journaled in a slotted conduit, a car having a grip supported independently of the car-body, one or more jaws for said grip hinged or pivoted together within the conduit, and actuating mechanism for said jaws located upon the car-body, substantially as set forth.

41. A cable-motor car having a clutch, J, formed of two jaws, K K, having pivoted bearings or supports above the cable and below the conduit-slot, and arms K' K', extending above the slot, substantially as set forth.

42. A cable-motor-railway car having its grip and brake shoes supported independently of the car-body and actuating mechanism for the grip and brake-shoes supported upon the car-body, substantially as set forth.

43. A cable-motor-railway car having its

grip and brake-shoes supported independently of the car-body and its grip and brake-shoe operating rod supported upon said body, substantially as set forth.

5 44. A cable-motor car having a grip composed of curved jaws pivoted to one another and having extensions K' K' above said slot, supporting devices for the grip attached to the truck-frame of the car, and actuating devices
10 for the grip located upon the car-body, substantially as set forth.

45. A cable-motor-railway car having a clutch or grip, J, the jaws K K of which are

pivoted one upon the other above the cable and below the conduit-slot and having extensions K' K' above said slot, substantially as set forth. 15

46. A slotted conduit for cable-railway cars having removable top plates the slot sides or edges of which are rounded, substantially as set forth. 20

JOHN P. HUNT.

Witnesses:

HETTIE R. HUNT,
R. P. HUNT,
RUFUS HARTRANFT.