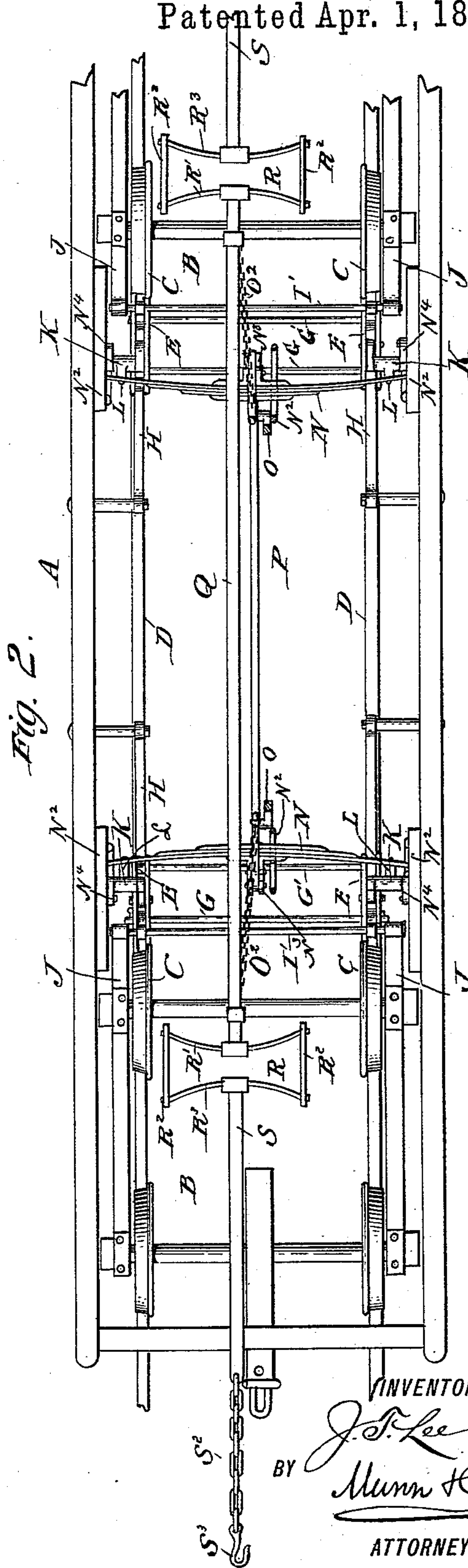
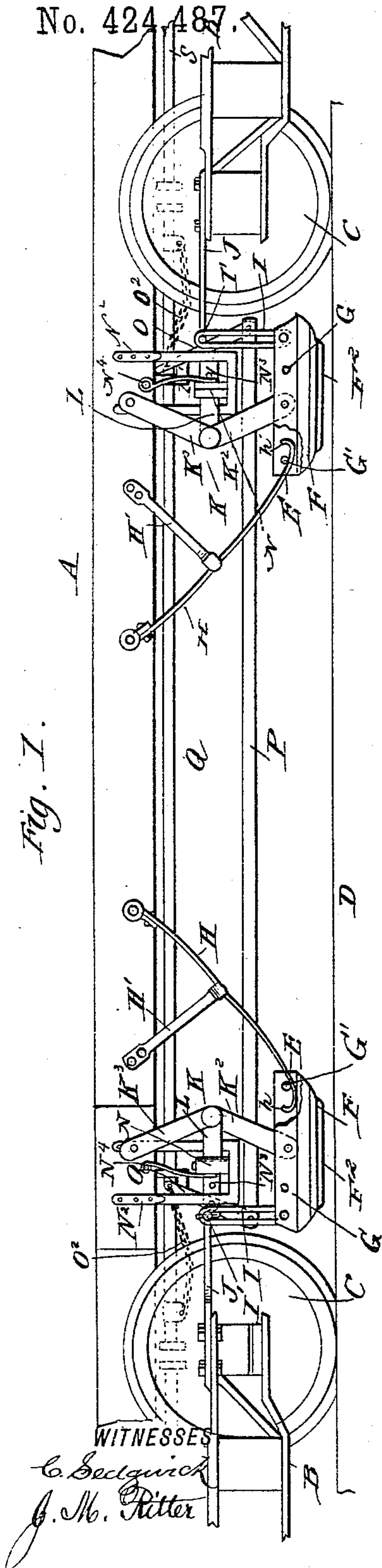


4 Sheets—Sheet 1.

Patented Apr. 1, 1890.

No. 424,487



N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.)

4 Sheets—Sheet 2.

J. T. LEE.
TRACK BRAKE.

No. 424,487.

Patented Apr. 1, 1890.

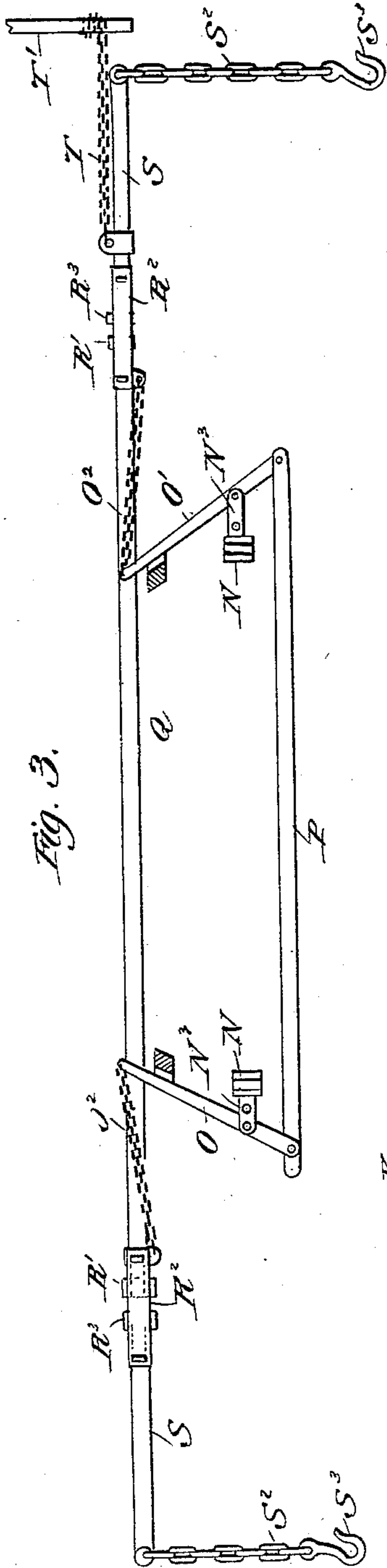


Fig. 3.

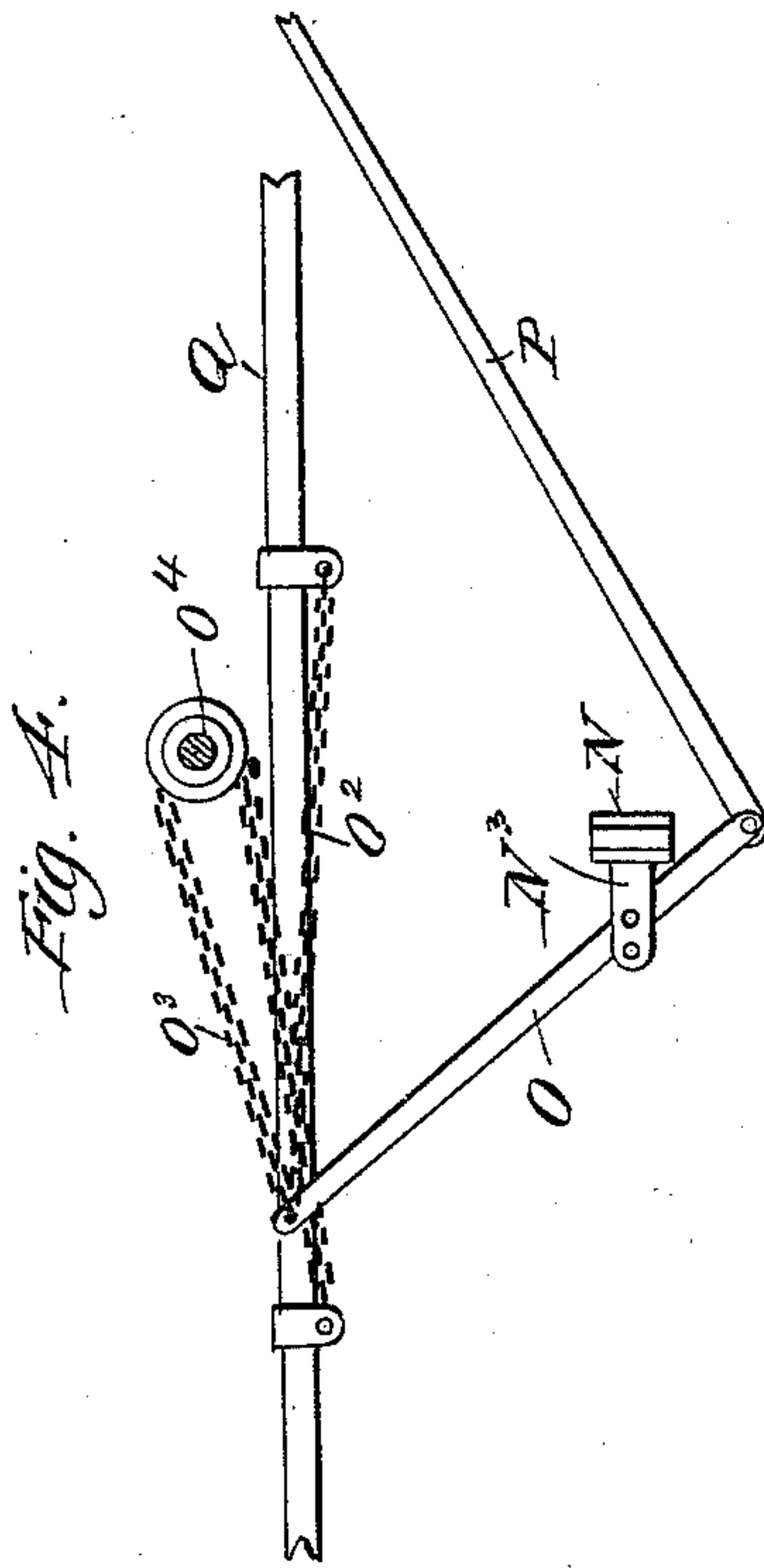


Fig. 4.

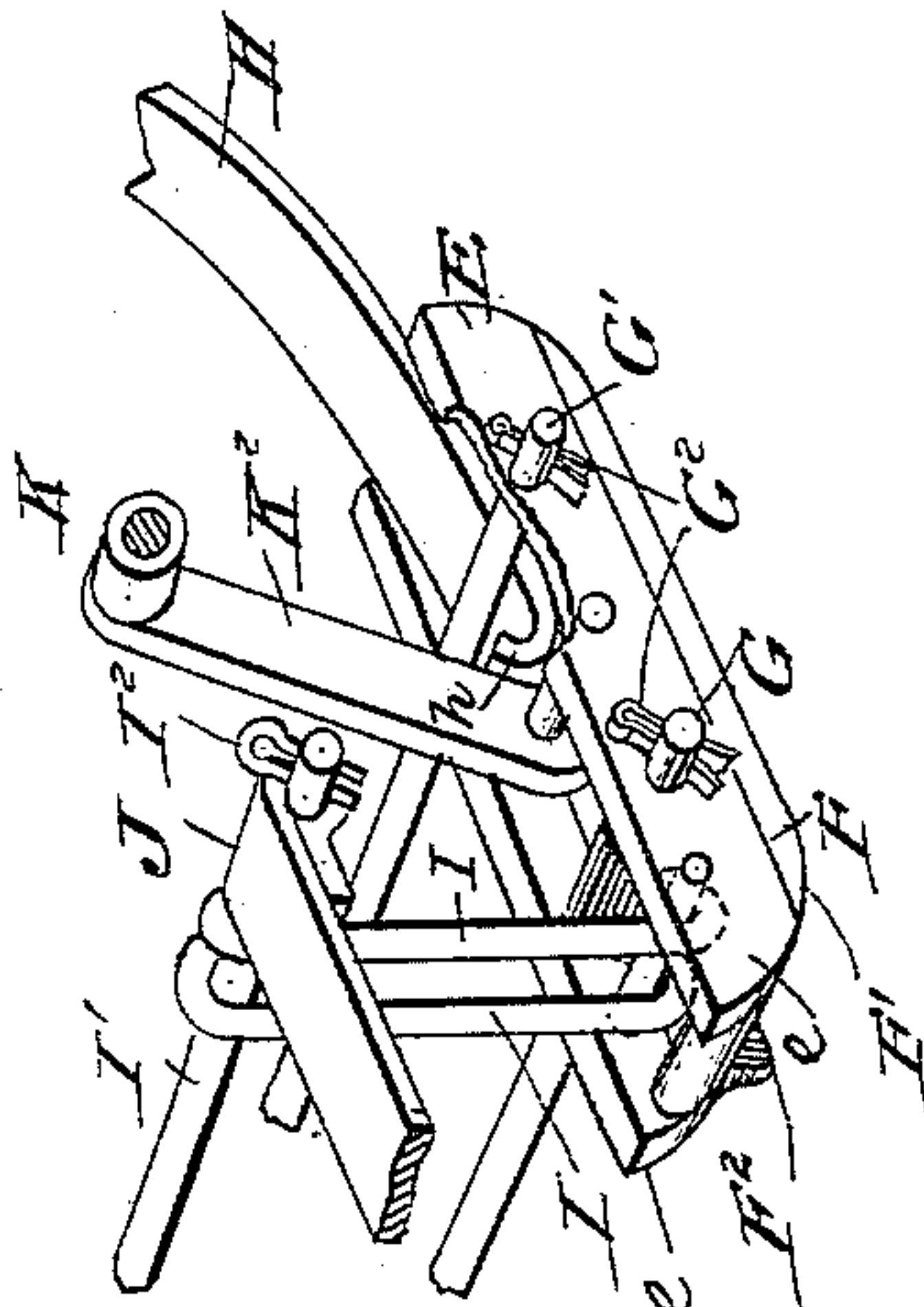


Fig. 5.

WITNESSES:

W. R. Davis.
C. Sedgwick

INVENTOR:

J. T. Lee
BY Munn & Co

ATTORNEYS.

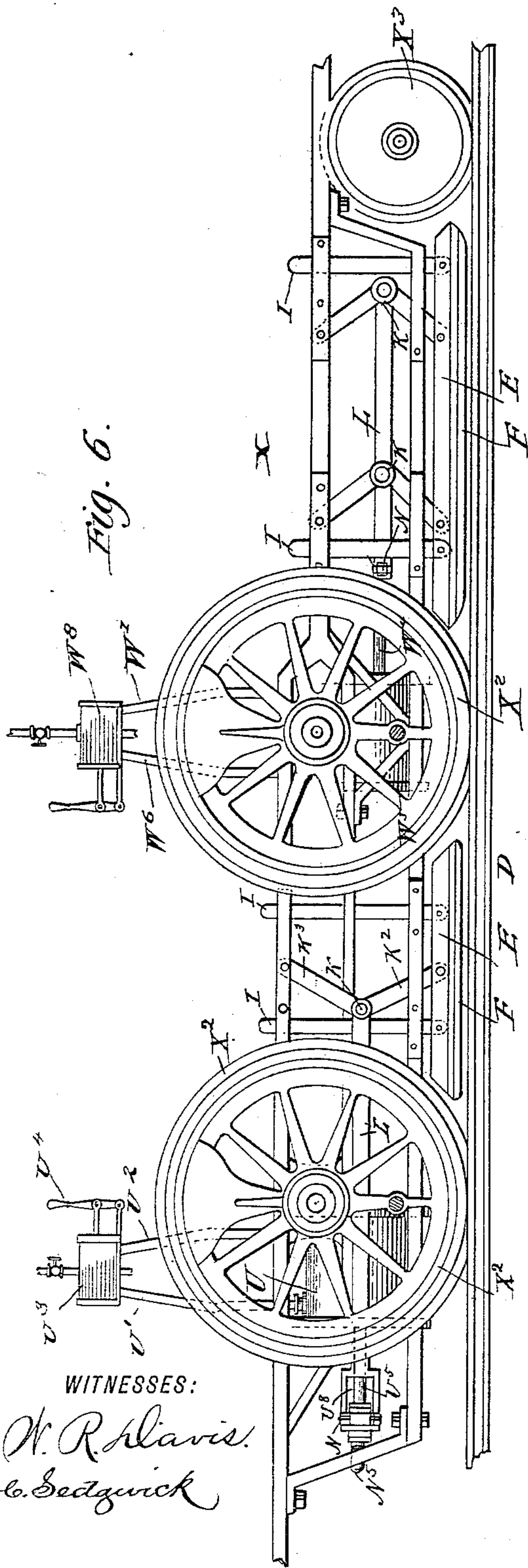
(No Model.)

4 Sheets—Sheet 3.

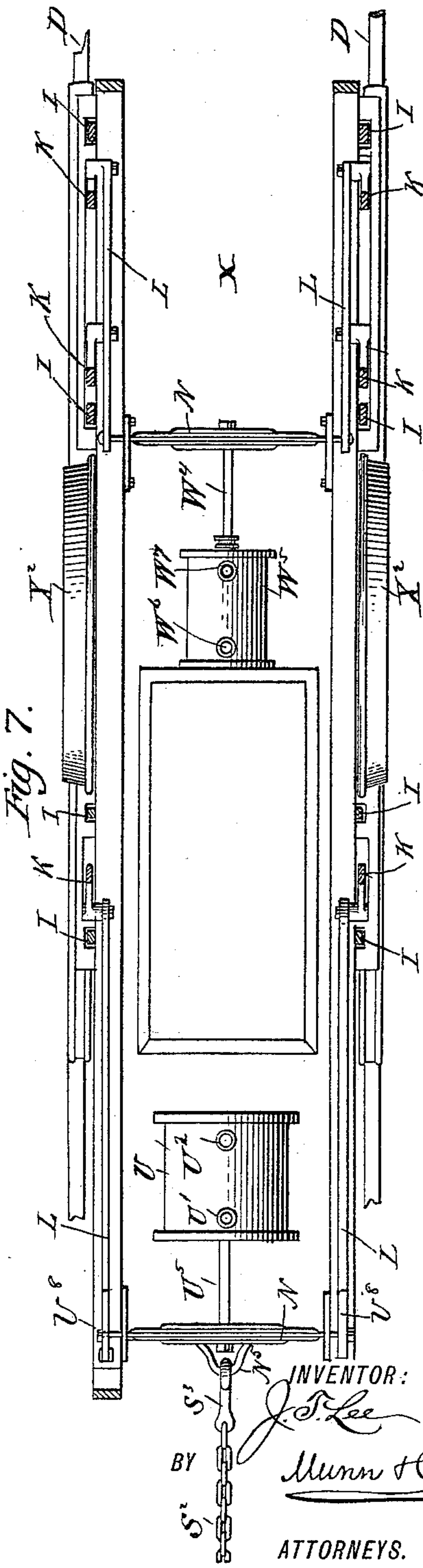
J. T. LEE.
TRACK BRAKE.

No. 424,487.

Patented Apr. 1, 1890.



WITNESSES:
W. R. Davis.
C. Sedgwick



INVENTOR:
J. T. Lee
BY *Munn & Co*
ATTORNEYS.

(No Model.)

4 Sheets—Sheet 4.

J. T. LEE.
TRACK BRAKE.

No. 424,487.

Patented Apr. 1, 1890.

Fig. 8.

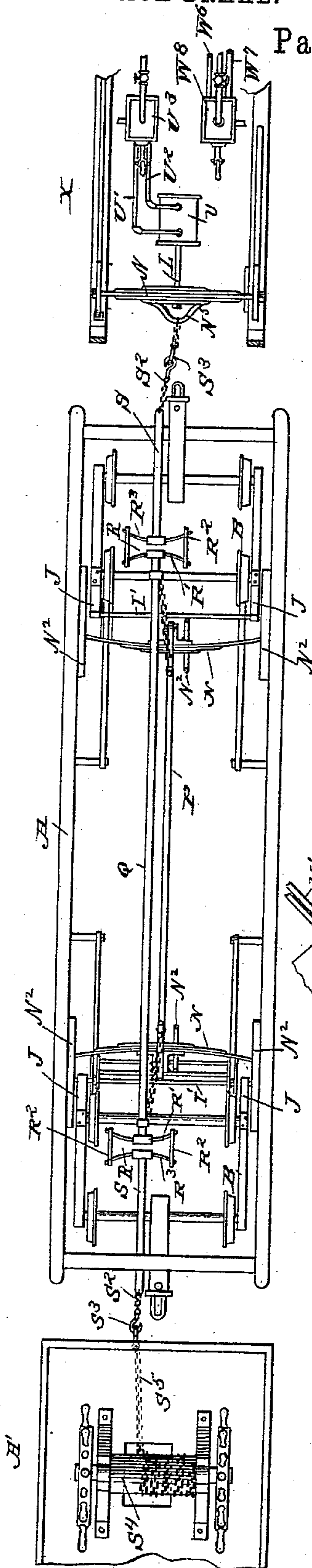
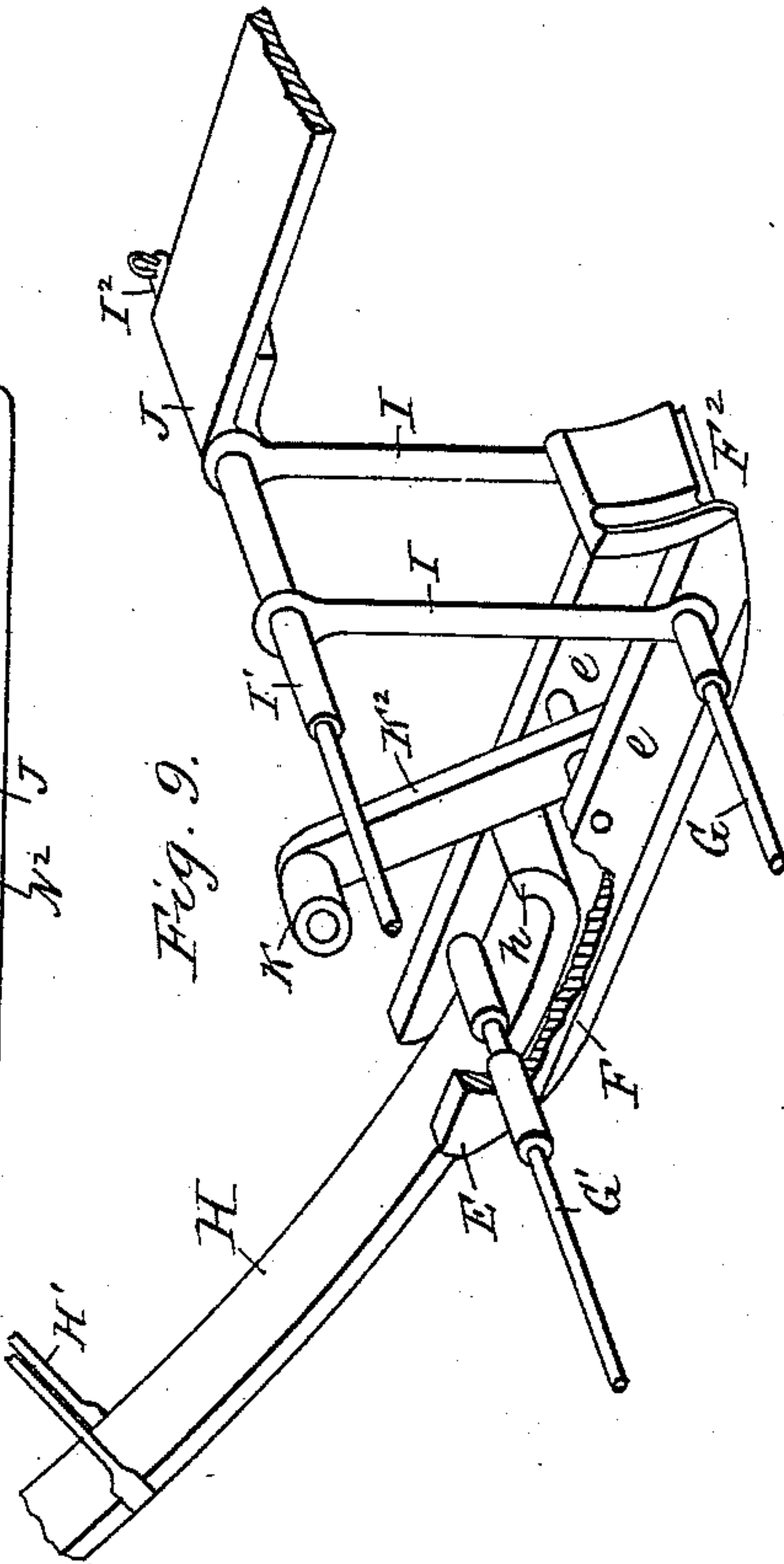


Fig. 9.



WITNESSES:

W. R. Davis.
C. Sedgwick

INVENTOR:

J. T. Lee
BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JULIUS THOMAS LEE, OF BOSTON, MASSACHUSETTS.

TRACK-BRAKE.

SPECIFICATION forming part of Letters Patent No. 424,487, dated April 1, 1890.

Application filed September 15, 1888. Serial No. 285,509. (No model.)

To all whom it may concern:

Be it known that I, JULIUS THOMAS LEE, formerly of Mattoon, in the county of Coles and State of Illinois, now residing in Boston, Massachusetts, have invented certain new and useful Improvements in Brakes for Railway-Cars; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates, generally, to brake mechanism for railway-cars, and particularly to that class of brake mechanism in which the brake-blocks are applied to track-rails, although, as is obvious, it is applicable in parts to brakes for engaging the wheels of cars; and it consists in the improved construction and arrangement or combination of parts hereinafter fully disclosed in the description, drawings, and claims.

The objects of my invention are, first, to provide novel and improved brake-blocks and mechanism for operating the same from various parts of a railway-train; second, to provide improved mechanism for operating brakes or brake-blocks by steam from the engine or locomotive and by hand-power from all other parts of the train; third, to provide yielding or elastic mechanism for connecting and operating said brake-blocks; fourth, to connect or combine spring or yielding brake-beams with steam-actuated reciprocating piston-rods; fifth, to provide the brake-block-operating rods, which are arranged beneath the cars, with spring-frames for admitting of their longitudinal extension and retraction; sixth, to provide improved means for connecting these extensible and retractible brake-operating rods at their ends; seventh, to provide novel constructions and arrangements of springs and connections for supporting the brake-blocks at their ends and lowering them to and raising them from the track-rails; eighth, to provide improved means for admitting the brakes upon the cars to be applied before those upon the locomotive, and, ninth, to provide certain other improved constructions and arrangements or combinations of parts which are accessorial to the accurate accomplishment of these objects.

In the accompanying drawings, forming part of this specification, in which reference-

letters are employed to indicate the same and corresponding or equivalent parts, Figure 1 represents a side elevation of enough of a railway-car to illustrate the construction and arrangement of my improved brake mechanism thereon; Fig. 2, a bottom plan view of the frame-work of a car provided with my improved brake mechanism; Fig. 3, a side elevation of part of the brake-block-operating mechanism detached from a car; Fig. 4, a side elevation of a modified form of the same; Fig. 5, a perspective detail view of one of the brake-blocks and the mechanism for connecting and operating the same; Fig. 6, a side elevation of the running-gear and a portion of the frame of a locomotive, illustrating the application thereto of my improved brake mechanism; Fig. 7, a horizontal part sectional view of the same; Fig. 8, a bottom plan view of parts of a train provided with my improved brake mechanism, and Fig. 9 a perspective detail view of one of the brake-blocks and its connecting and operating mechanism as viewed from the opposite side of the same parts illustrated in Fig. 5.

In the drawings, the letter A indicates the frame or body of the car, which is supported upon the usual truck-frames B, in which the axles of the wheels C are journaled.

The track-rails are indicated by the letter D.

The brake-blocks E are supported above the rails and provided with the brake-shoes F, which are secured to their under sides. These brake-shoes are provided with downwardly-extending flanges F² on their inner sides, as shown in Figs. 5 and 9, which are adapted to bear against the inner sides of the track-rails D when said brake-blocks are forced down into contact therewith. The inner end of each of these brake-blocks is supported by means of a flat spring H, which is slightly curved and pivotally secured at its upper end to the car-body; also, it is braced and held at its middle by a stirrup H', which extends obliquely from said car-body, as shown in Figs. 1, 5, and 9; also, the lower end of each of these curved flat springs is formed with a bent or upturned end h, which fits between two side flanges e of the brake-block E. The end of a stay-rod G' is secured in holes formed in these side flanges, so that said stay-rod will securely hold the bent or

upturned end h of said spring in place in the brake-block. The ends of each stay-rod are held in place by split or spring keys G^2 . The outer end of each brake-block is pivotally connected to upwardly-extending rods I , 5 having their lower ends hung upon a transverse stay-rod G , which is also secured in the flanges e of the brake-block; also, the upper end of each rod I is pivoted upon a transverse rod I' , the outer end of which is yieldingly secured in the end of a flat plate or spring J , which is fastened to the truck-frame B ; also, the end of said rod is firmly held in said plate or spring by means of the split or spring key 10 I^2 , as shown in Figs. 5 and 9. This plate or spring is arranged to project horizontally inward from near the end of the truck-frame B , with its inner end above and outside of the outer end of the brake-block. These rods G , 20 G , and I' extend transversely beneath the car frame or body and connect a directly-opposite brake-block on the other side of the car, which is constructed, arranged, and supported the same as the one just described. As 25 these brake-blocks are slightly curved at their ends, pivotally and slidably supported, and otherwise constructed as above described, it is obvious that they are capable of being moved to and from the track-rails, and 30 also to and from the car-wheels, and that when they are firmly set upon the rails their outer ends will press slightly against and resist the rotation of said wheels. To the middles of these brake-blocks are pivoted the lower arms 35 K^2 of the toggle-levers K , while the upper arms K^3 of said toggle-levers are pivoted to the car frame or body at their upper ends, as shown in Fig. 1. Rods L are pivotally connected at their inner ends to the joints of 40 said toggle-levers and secured at their outer ends to the ends of the spring brake-beams N , which extend transversely beneath the body of the car and are supported and capable of being slid back and forth in the frames 45 or guideways N^2 , secured to the middle and sides of the car-body, as shown in Figs. 1 and 2. The arms N^3 extend from near the middles of these spring brake-beams and are pivoted to the levers O , which are pivoted at their lower 50 ends to the reach-rod P , as shown more plainly in Fig. 3.

The chains O^2 are attached to the upper ends of the levers O and secured to a brake-operating or reach rod Q , which is longitudinally supported beneath the car-body. The 55 ends of this reach-rod are secured to the middles of two spring-frames R , consisting of the flat, curved, or concaved springs R' and R^3 and the links R^2 , connecting the same at their 60 ends. The rods S are secured at their inner ends to the middles of the concaved springs R^3 , and to their outer ends are attached the chains S^2 , which have the hooks S^3 secured thereto for attachment to a corresponding 65 hook and chain on the adjacent cars or the tender of the locomotive. The short springs

N^4 are attached to the sides of the car-body and bear against the outer sides of the ends of the spring brake-beams for assisting to throw said beams back to their normal posi- 70 tions, or with the brake-blocks raised.

The brake-blocks E upon the locomotive X are preferably so supported as to be moved vertically by rods I , which slide in upper and lower bearings or guideways in the sides of 75 the locomotive-frame, as shown in Figs. 6 and 7. The rods L , which are pivotally connected to the joints of the rear toggle-levers K , are formed with lengthwise-extending slots U^3 at their rear ends, in which the ends of the rear 80 spring brake-beam N may have a limited play. This rear spring brake-beam of the locomotive is provided with an eye N^5 , into which the hook S^3 of the brake mechanism of the tender or forward car may be introduced; 85 also, to the center of this brake-beam is secured the piston-rod U^5 of a piston which slides within a steam-cylinder U , which is arranged under the foot-board of the locomotive and provided near its ends with the 90 steam-pipes U' and U^2 . A suitable steam-chest U^3 , which is provided with a distributing-valve controlled by a suitable lever U^4 , is arranged within the cab of the locomotive and within convenient reach of the engineer. 95 This lever and valve serve to supply either end of the steam-cylinder U with live steam and exhaust the same at the other end through the pipe U' or U^2 , according to the position of the valve in said steam-chest, and thus the 100 piston-rod U^5 and the spring brake-beam N may be moved forward or backward, the intermediate parts operated, and the brake-blocks applied to and removed from the track-rails, according to the desire of the engineer. For 105 instance, when the piston-rod U^5 is moved forwardly, the toggle-levers K are moved in the same direction, and this forces the brake-blocks E downward and the brake-shoes F into contact with the track-rails D . When 110 said piston-rod moves in the opposite direction, then said toggle-levers are moved rearwardly, which will cause said brake-blocks to assume their former position, or out of contact with said track-rails. The locomotive X 115 is also preferably supplied with additional brake mechanism, which is to be used in case of an emergency—such as a collision—and is held under separate control by the engineer. The brake-blocks E are located between the 120 front driving-wheels X^2 and the pilot-wheels X^3 , as shown in Fig. 6, and are also mounted to slide vertically on rods I , which are also mounted vertically in suitable bearings on the locomotive-frame. The engine-frame is for 125 this purpose also provided with upper and lower guideways, which are suitably bolted thereto, as shown in Fig. 6. These brake-blocks are supported by toggle-levers K , the arms thereof being pivotally connected by 130 rods L , which are also pivotally connected to the opposite ends of a spring brake-beam N ,

which is mounted transversely in suitable bearings on the locomotive-frame and connected at its middle with a piston-rod W^4 , which operates a piston in the steam-cylinder W^5 , which is provided near its ends with the pipes W^6 and W^7 , which lead to a steam-chest W^8 , provided with a valve and an operating-lever similar in construction to those above referred to. The piston in the steam-cylinder W^5 is operated in the same manner as the piston in the steam-cylinder U , so that when the engineer desires to apply the brake-blocks he merely has to admit steam into the pipe W^7 , when the piston-rod W^4 and its piston will be moved and exert a pull upon the spring brake-beam N , which will then move the toggle-levers K toward a vertical position, and thus force the brake-blocks downward and into firm contact, through the brake-shoes F , with the track-rails D . The brake-blocks are then released by the engineer admitting steam through the pipe W^6 into the steam-cylinder W^5 .

The rear car or caboose A' of the train, as shown in Fig. 8, is provided with a drum or windlass S^4 , on which is wound a chain S^5 , which is connected to the hook S^3 of the chain S^2 , leading from the adjoining car, whereby all the brakes of the train of cars can be controlled or operated by the conductor located in said caboose; also, as shown in Fig. 3, each car is provided with the usual brake-shaft T' , which is mounted upon the car-body A in the usual manner and connected by means of the chain T , through the rod S and spring-frame R , to the brake-operating or reach rod Q , whereby the brakeman can also apply the brakes whenever necessary.

In case only one set or pair of brakes or brake-blocks is to be used on a single car the operating mechanism shown in Fig. 4 is employed, in which the reach-rod P is pivotally connected at one end to the car-body, instead of to the opposite lever O , as shown in Fig. 3, and in which the chains O^2 and O^3 are attached to the upper end of the lever O ; also, said chain O^3 is passed around a drum or pulley O^4 , held on the underside of the car-body, and is then secured to the brake-operating or reach rod Q , whereby said lever O will be tilted whenever and in whatever direction said brake-operating or reach rod may be slid or moved.

The operation of my improved brake mechanism, in addition to that hereinbefore described, is as follows: When the brakes upon the cars are to be applied to the track-rails from the cars themselves, each brake-shaft T' is revolved and a pull exerted on the rod S , the rod Q receiving a like movement in the direction of the pull and against the concaved springs R' and R^3 . Pressure is thus exerted through the rod P by the levers O against the spring brake-beams N , causing the toggle-levers K to open or straighten and press the brake-blocks E downward until their brake-

shoes F come in contact with the track-rails D , said brake-blocks thus engaging the rails very firmly, and consequently checking the motion of the car. The toggle-levers are opened or raised by the pull of the rods L upon their joints. As the flat springs H and J are bent downwardly during this operation, they will, when pressure is removed therefrom, assist in raising said brake blocks and shoes from said track-rails after the brake-operating or reach rods S and Q have been released. The short springs N^4 , which bear against the ends of the spring brake-beams N , serve to return them to their normal positions, and at the same time move the rods L inwardly, bend the toggle-levers K , and raise the brake blocks and shoes. These spring brake-beams and flat springs also serve to moderate the downward pressure of the brake blocks and shoes, so that they will not raise the wheels off the track-rails when depressed, but hold them down firmly thereon; also, they assist the concaved springs R' and R^3 , attached to the rods Q and S , to allow and compensate for any excessive longitudinal movement of the latter which might be caused by their being drawn too far toward either end of the car.

As the toggle-levers are connected to the body of the car and to the brake-blocks, the latter being also connected by the links I and springs J to the car-trucks, the resistance or weight of the car-body will not only increase the pressure of said brake-blocks upon the track-rails, but will cause the downward pressure upon said brake-blocks to pull downward upon said car-trucks and their wheels through said links and springs and hold them firmly upon said track-rails.

While the brake blocks and shoes are pivotally and slidably supported and capable of being moved to and from the track-rails, and also to, against, and from the peripheries of the car-wheels, they are, nevertheless, firmly attached to the car-body and truck-frames and held directly over the track-rails in front of the car-wheels and close thereto.

In a train the hooks S^3 upon the chains S^2 of all the cars are connected, excepting the hook upon the forward chain of the front car, which is hooked into the eye N^5 of the rear spring brake-beam of the locomotive, and excepting the hook upon the rear chain of the rear car, in case the train be a freight-train, which is hooked into the chain S^5 , extending from the drum S^4 in the caboose A' .

When the engineer desires to apply the brakes, steam is admitted into the rear end of the steam-cylinder U from the steam-chest U^3 , when the chains and brake-operating rods will be drawn and pushed forward, applying said brakes to the track-rails and stopping or slowing up the train.

Owing to the presence of the lengthwise-extending slots U^8 in the rear ends of the rods L of the locomotive, the rear piston-rod

U⁵ and spring brake-beam N of the locomotive are adapted to be moved a short distance for operating the brake-blocks of the cars before said rods operate the toggle-levers and
 5 apply the brake-blocks of the locomotive, whereby the cars will be prevented from coming into violent contact with the locomotive by their momentum, as might be the case were said slots not present, as they admit of
 10 a slightly farther movement of the brake-operating rods S and Q of the cars than of the rods L, which operate the brake-blocks of the locomotive; also, said slots admit of the brake-blocks of the locomotive being released
 15 before the brake-blocks of the cars, the brake-blocks of the rear car being last to be released.

As the rods Q and S are attached at their inner ends to the concaved springs R' and R³, the latter permit the former to be extended
 20 under the strain or tension occurring in applying the brakes and to be retracted when said strain or tension is removed; hence, as is obvious, these parts are capable of use in connection with the class of brakes employed
 25 to engage the wheels of cars; also, these rods and springs obviate the liability of breakage of the brake mechanism in starting and stopping the cars; also, by connecting the brake-blocks at their opposite ends to the frame of
 30 the locomotive, and also to the car-bodies and car-trucks, they will when applied rest firmly and flat upon the track-rails, and also support a portion of the weight of said locomotive and cars; also, under my improved construction and arrangement of the brake mechanism, the brakes or brake-blocks upon the locomotive and cars can be applied, as stated, by
 35 the engineer, by the conductor in the caboose, and by the brakemen of the individual or intermediate cars, whereby all of said brakes or brake-blocks upon the train are under control from the front, rear, and middle of the train. This is especially desirable in case a
 40 train should break apart, as the first part could be stopped by the engineer, the middle part by the brakemen, and the rear part by the conductor.

It will be obvious from the foregoing that the brake-shoes first engage the rails, and not
 50 directly the wheels of the cars or locomotive, that the wear on said brake-shoes and wheels is decreased, and that at the same time the brake-shoes when applied will make a quicker stop than usual.

It will be further apparent that the entire brake mechanism is not complicated, but simple in construction, comparatively inexpensive to manufacture, easy to operate, and not liable to get out of order, that the brake-shoes
 55 cannot hang upon the wheels, as is frequently the case with the brakes now employed, and that said shoes cannot drag upon the wheels and cause friction at all times, thus avoiding wear upon said wheels and saving cost of independently operating the brakes upon the engine and the several cars of a train.
 65

It will be further apparent that the brakes can be instantly thrown on or off the rails, that they cannot apply themselves, as is frequently the case with the brakes now employed, and
 70 that they can be connected to any other brake piston or rod now in use without material reorganization of their parts.

Having thus fully described the construction, arrangement or combination, and operation of the several parts of my improved railway-brake mechanism and its advantages, what I claim as new is—

1. The combination, with a train and brake-blocks attached thereto, of toggle-levers connected to said blocks, spring brake-beams connected to said toggle-levers, and mechanism for connecting the same and said brake-blocks to and operating them from the front, rear, and intermediate parts of said train, substantially as described.
 85

2. The combination, with a train and brake-blocks attached thereto and adapted to engage track-rails, of spring brake-beams connected to said blocks, rods connected to said
 90 spring brake-beams, and mechanism for connecting said beams, blocks, and rods to and operating them from the front, rear, and intermediate parts of said train, substantially as described.
 95

3. The combination, with a train and brake-blocks attached thereto, of toggle-levers, spring brake-beams, rods connected to said spring brake-beams, and mechanism for connecting said beams, blocks, and rods to and operating
 100 them from the front, rear, and intermediate parts of said train, substantially as described.

4. The combination, with a train and brake-blocks attached thereto and adapted to engage track-rails, of spring brake-beams connected to said brake-blocks, rods and chains
 105 connected to said brake-beams, and mechanism for connecting them to and operating them from the front, rear, and intermediate parts of said train, substantially as described.
 110

5. The combination, with a train and brake-blocks attached thereto, of spring brake-beams connected to said brake-blocks, toggle-levers, rods connected to said spring brake-beams, and mechanism for longitudinally moving said
 115 rods from the front, rear, and intermediate parts of said train, substantially as described.

6. The combination, with a train and brake-blocks attached thereto, of spring brake-beams connected to said brake-blocks, rods
 120 connected to said spring brake-beams, brake-shafts for sliding or moving said rods, a steam-cylinder having a reciprocating piston-rod for moving said rods, and also a drum or windlass for operating said rods, substantially as
 125 described.

7. In car-brake mechanism, a brake-block E, having curved or upturned ends, a shoe F, a downwardly-extending inside flange F², and two side flanges e, substantially as described.
 130

8. In car-brake mechanism, a brake-block E, having curved or upturned ends, a shoe F,

a downwardly-extending inside flange F^2 , and two side flanges e , in combination with a car-body and mechanism for operating said brake-block, substantially as described.

5 9. In car-brake mechanism, the combination, with the car-body A and the brake-blocks E, of the springs H, the stirrups H' , the rods I, the plates or springs J, the toggle-levers K, and mechanism for operating said toggle-
10 levers and brake-blocks, substantially as described.

10. In car-brake mechanism, the combination, with the car-body A and the brake-blocks E, of the springs H, the stirrups H' ,
15 the rods I, the plates or springs J, the toggle-levers K, the rods G' , G, and I' , the rods L, and mechanism for operating the latter and said toggle-levers and brake-blocks, substantially as described.

20 11. In car-brake mechanism, the combination, with the car-body A and the brake-blocks E, of the springs H, having the bent or upturned lower ends h , the rods G' , G, and I' , the rods I, the toggle-levers K, the rods L,
25 and suitable operating mechanism, substantially as described.

12. The combination, with a railway-car and brake-blocks attached thereto and adapted to engage track-rails, of spring brake-beams
30 connected to said brake-blocks, rods connected to said spring brake-beams, spring-frames for admitting of the longitudinal extension and retraction of said rods, and mechanism for longitudinally moving said rods,
35 substantially as described.

13. The combination, with a railway-car and brake-blocks attached thereto and adapted to engage track-rails, of spring brake-beams connected to said brake-blocks, levers pivotally
40 connected to each other, and also near their middles to said spring brake-beams, longitudinal rods connected to said levers, spring-frames for admitting of the longitudinal extension and retraction of said rods, and means
45 for operating the latter, substantially as described.

14. The combination, with a railway-car and brake-blocks attached thereto and adapted to engage track-rails, of spring brake-beams connected to said brake-blocks, levers pivoted to
50 said brake-beams, a rod pivoted to and connecting the lower ends of said levers, means for connecting the upper ends of said levers, rods, spring-frames, chains, and suitable operating mechanism, substantially as described.
55

15. The combination, with a railway-car and brake-blocks attached thereto and adapted to engage track-rails, of spring brake-beams connected to said brake-blocks, levers pivoted to
60 said brake-beams, a rod pivoted to and connecting the lower ends of said levers, rods and chains connecting the upper ends of said levers, spring-frames connecting the last-named rods and admitting of their longitudinal extension and retraction, and chains and brake-
65 shafts for longitudinally moving said rods, substantially as described.

16. The combination, with railway-cars and brake-blocks attached thereto and adapted to engage track-rails, of spring brake-beams connected to said brake-blocks, levers pivoted
70 near the middles of said brake-beams, rods pivoted to and connecting the lower ends of said levers, rods and chains connecting the upper ends of said levers, spring-frames connecting the rods last named and admitting of
75 the longitudinal extension and retraction of said rods, and chains having hooks at their ends for connecting said rods and cars, substantially as described.
80

17. The combination, with a railway-car and brake-blocks attached thereto and adapted to engage track-rails, of spring brake-beams connected to said brake-blocks, a rod connected
85 to said spring brake-beams, a brake-shaft, and chains connecting the same to said rod, substantially as described.

18. In car-brake mechanism, the combination, with a brake-block for engaging a track-rail and a toggle-lever suitably pivoted at its
90 upper end and pivotally connected at its lower end to said brake-block, of a rod pivotally connected to the joint of said toggle-lever, a transverse spring brake-beam connected to said rod, and means for moving said beams
95 longitudinally to and fro of the car, substantially as described.

19. In car-brake mechanism, the combination, with brake-blocks for engaging track-rails and toggle-levers suitably pivoted at
100 their upper ends and pivotally connected at their lower ends to said brake-blocks, of rods pivotally connected to the joints of said toggle-levers, a transverse spring brake-beam having its ends secured to said rods, and a rod
105 connected to said brake-beam and adapted to move or operate the same longitudinally to and fro of the car, substantially as described.

20. In car-brake mechanism, the combination, with brake-blocks for engaging track-rails and toggle-levers pivoted at their upper
110 ends and also at their lower ends to said brake-blocks, of rods pivoted to the joints of said toggle-levers, spring brake-beams having their ends secured to said rods and having
115 arms projecting from their middles, levers pivoted to said arms, and longitudinally-movable rods connected to and adapted to operate said levers, substantially as described.

21. In car-brake mechanism, the combination, with brake-blocks and toggle-levers pivoted at their upper ends and also at their
120 lower ends to said brake-blocks, of rods pivoted to the joints of said toggle-levers, spring brake-beams having their ends secured to
125 said rods and having arms projecting from their middles, levers pivoted to said arms, a rod connecting the lower ends of said levers, and longitudinally-movable rods connecting the upper ends of said levers, substantially
130 as described.

22. In car-brake mechanism, the combination, with a car-body, a truck-frame, and brake-blocks, of curved springs secured to said

car-body and movably connected to the inner ends of said brake-blocks, horizontally-arranged springs secured at their outer ends to said truck-frame and connected at their inner ends to the outer ends of said brake-blocks, toggle-levers pivoted to said car-body and brake-blocks, and mechanism for raising and lowering said toggle-levers and brake-blocks, substantially as described.

23. In car-brake mechanism, the combination, with a car-body and a truck-frame, of brake-blocks, toggle-levers, downwardly-curved springs secured to said car-body and movably connected to the inner ends of said brake-blocks, stirrups secured to said car-body and supporting the middles of said curved springs, and horizontally-arranged springs secured at their outer ends to said truck-frame and connected at their inner ends to the outer ends of said brake-block, substantially as described.

24. In car-brake mechanism, the combination, with a car-body and a truck-frame, of brake-blocks, toggle-levers pivoted to said car-body and brake-blocks for raising and depressing the latter, curved springs secured to said car-body and movably connected to the inner ends of said brake-blocks, stirrups secured to said car-body and supporting the middles of said curved springs, horizontally-arranged springs secured at their outer ends to said truck-frame, and rods connected to said springs and also to the outer ends of said brake-blocks by stay-rods, substantially as described.

25. In car-brake mechanism, the combination, with a car-body and a truck-frame, of brake-blocks, curved springs secured to said car-body and the inner ends of said brake-blocks, stirrups secured to said car-body and supporting the middles of said curved springs, horizontally-arranged springs secured to said truck-frame, rods connected to said last-named springs and to the outer ends of said brake-blocks, toggle-levers pivoted at their upper ends to said car-body and at their lower ends to said brake-blocks, a transverse spring brake-beam connected to said toggle-

levers, and mechanism for moving the same longitudinally of said car-body, substantially as described.

26. In car-brake mechanism, the combination, with a car-body and truck-frames, of brake-blocks adapted to engage track-rails, curved springs secured to said car-body and movably connected to the inner ends of said brake-blocks, stirrups secured to said car-body and supporting the middles of said curved springs, horizontally-arranged springs secured to said truck-frames, rods connected to said last-named springs and to the outer ends of said brake-blocks, toggle-levers pivoted at their upper ends to said car-body and at their lower ends to said brake-blocks, rods pivoted to the joints of said toggle-levers, transverse spring brake-beams secured at their ends to said rods, adapted to slide longitudinally in fixed guides in said car-body and provided with arms upon their middles, levers pivoted to said arms, a rod connecting the lower ends of said levers, longitudinally movable, extensible, and retractible rods, and chains connecting the same to the upper ends of said levers, substantially as described.

27. In car-brake mechanism, the combination, with a locomotive and one or more cars, of brake-blocks adapted to engage track-rails, spring brake-beams arranged transversely of said locomotive and car or cars, a chain connected to the rear spring brake-beam of said locomotive, rods and chains for connecting said brake-beam to the brake-beams of said car or cars, toggle-levers, and rods for operating the same and the brake-blocks of said locomotive and car or cars, the rods connected to the rear spring brake-beam of the locomotive being formed with longitudinal slots in their rear ends for admitting of slight play of said brake-beam and operating the brake-blocks of the car or cars slightly before those of the locomotive are operated, substantially as and for the purpose described.

J. THOMAS LEE.

Witnesses:

GEORGE TERWILLIGER,
FRANK W. DANA.