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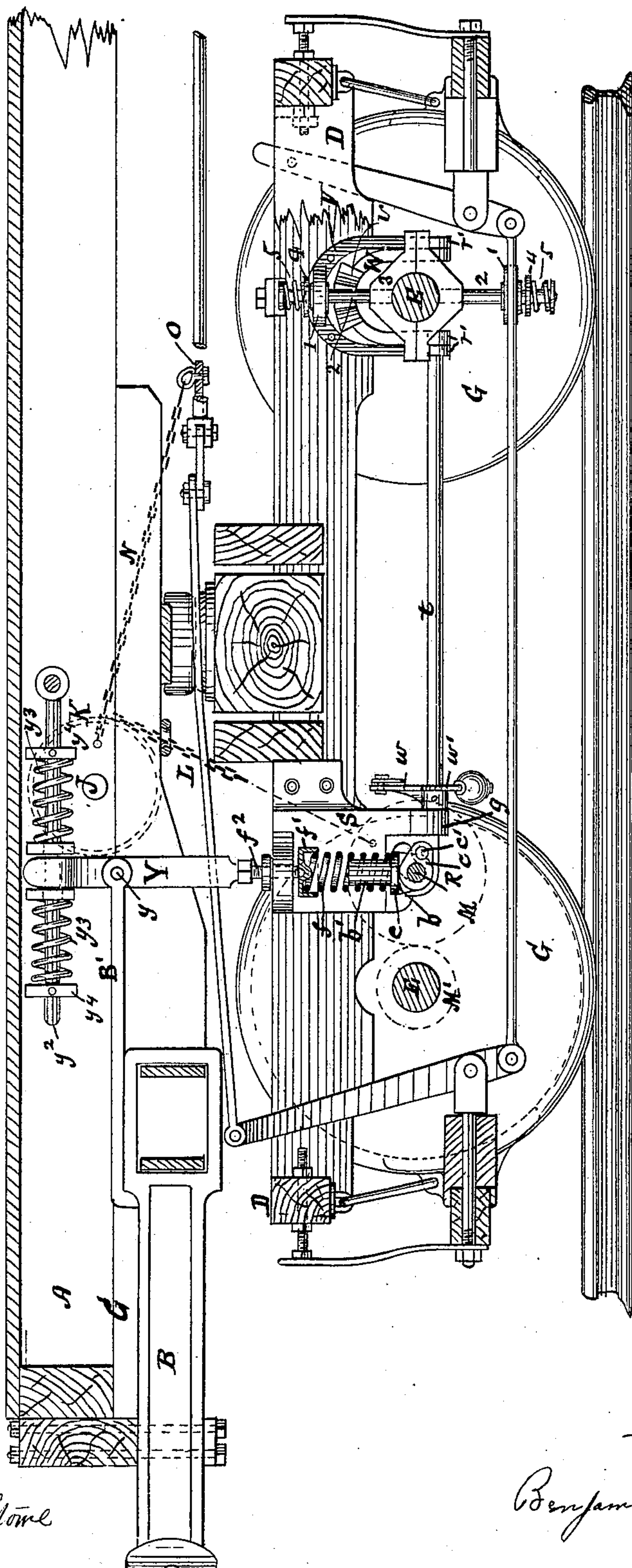
5 Sheets—Sheet 1.

B. L. STOWE.
AUTOMATIC CAR BRAKE.

No. 245,576.

Patented Aug. 9, 1881.

Fig. 1.



Witnesses:

Henry Giddings
Nathan Stowe

Inventor:

Benjamin L. Stowe

(No Model.)

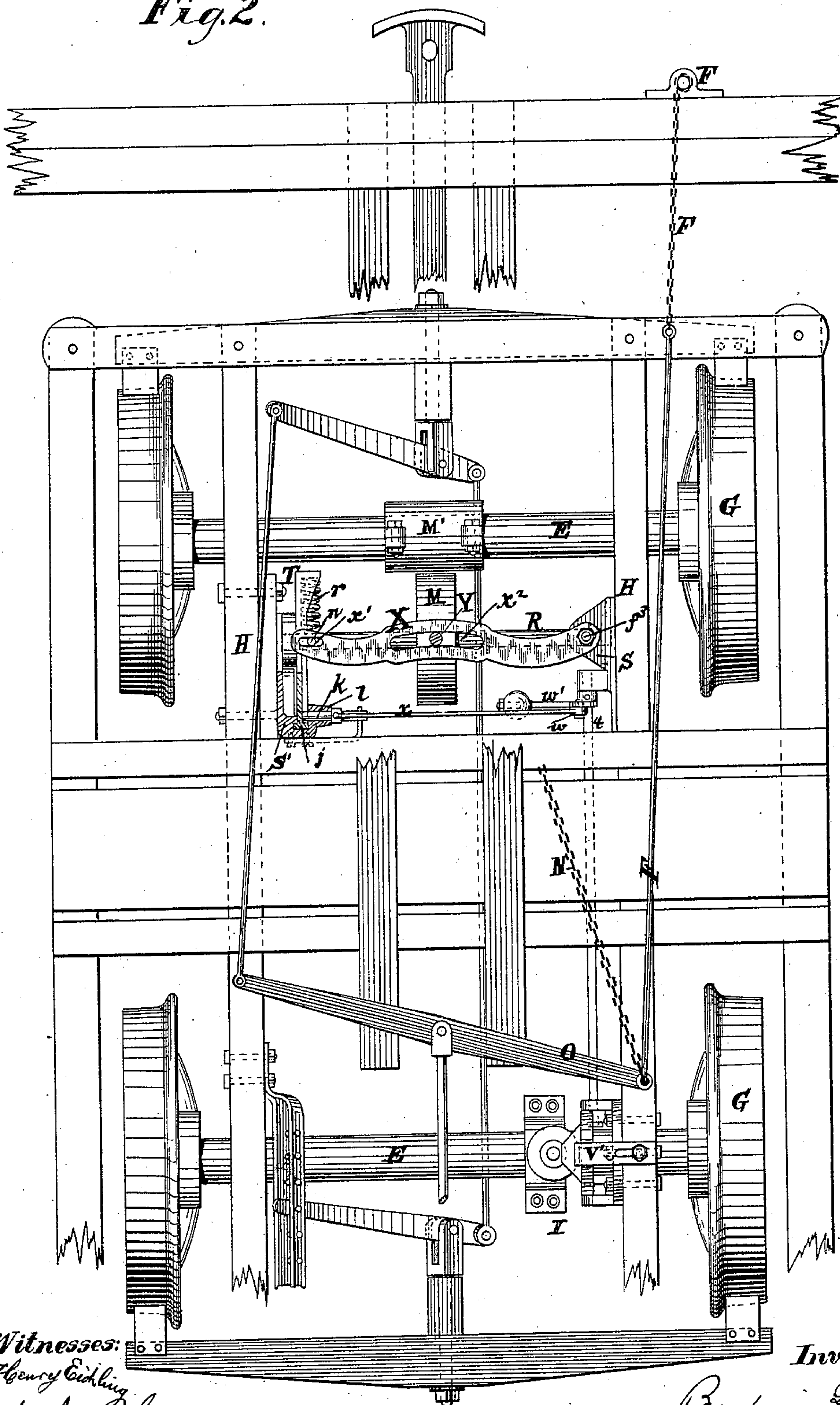
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B. L. STOWE.
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No. 245,576.

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Fig. 2.



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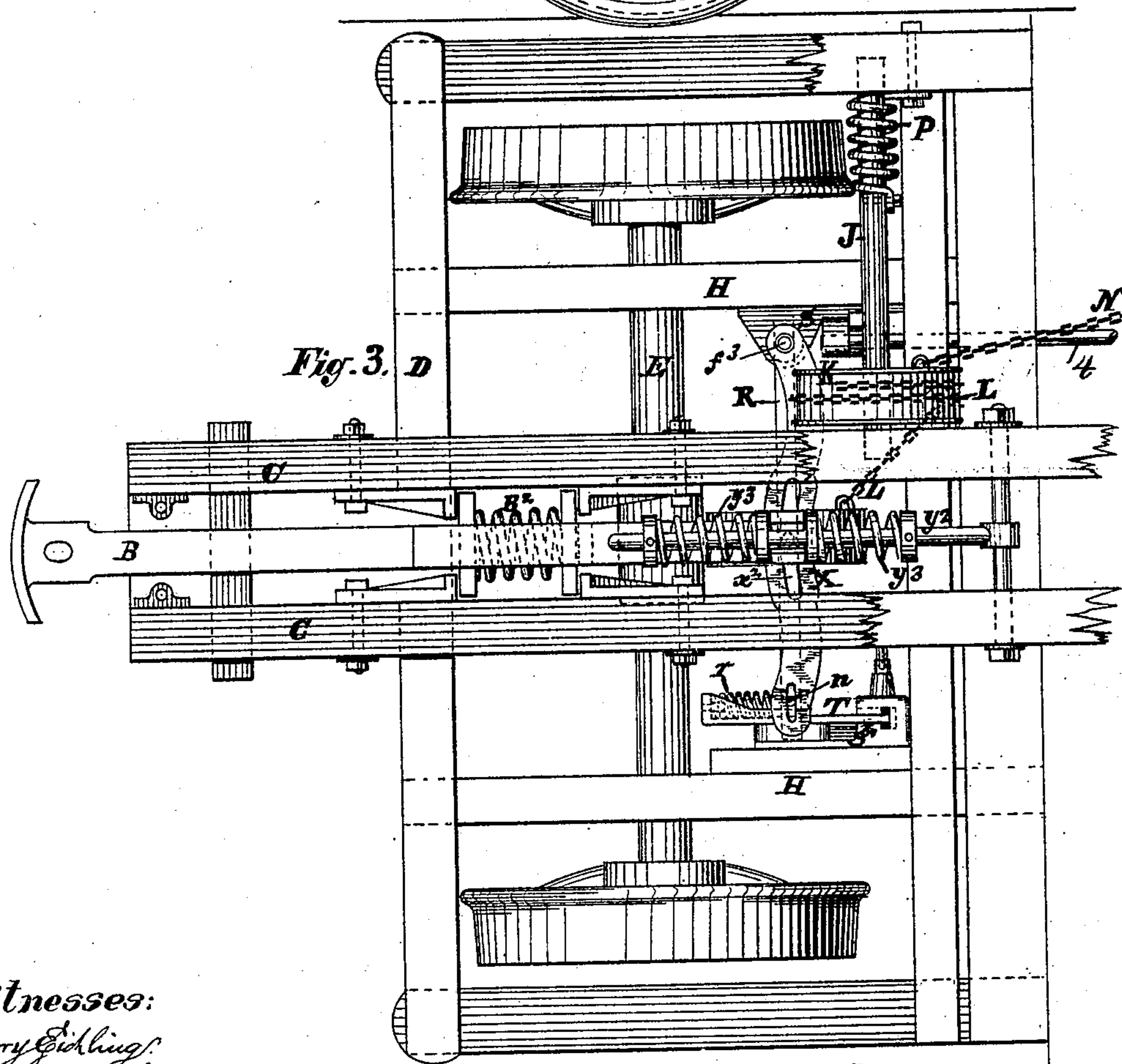
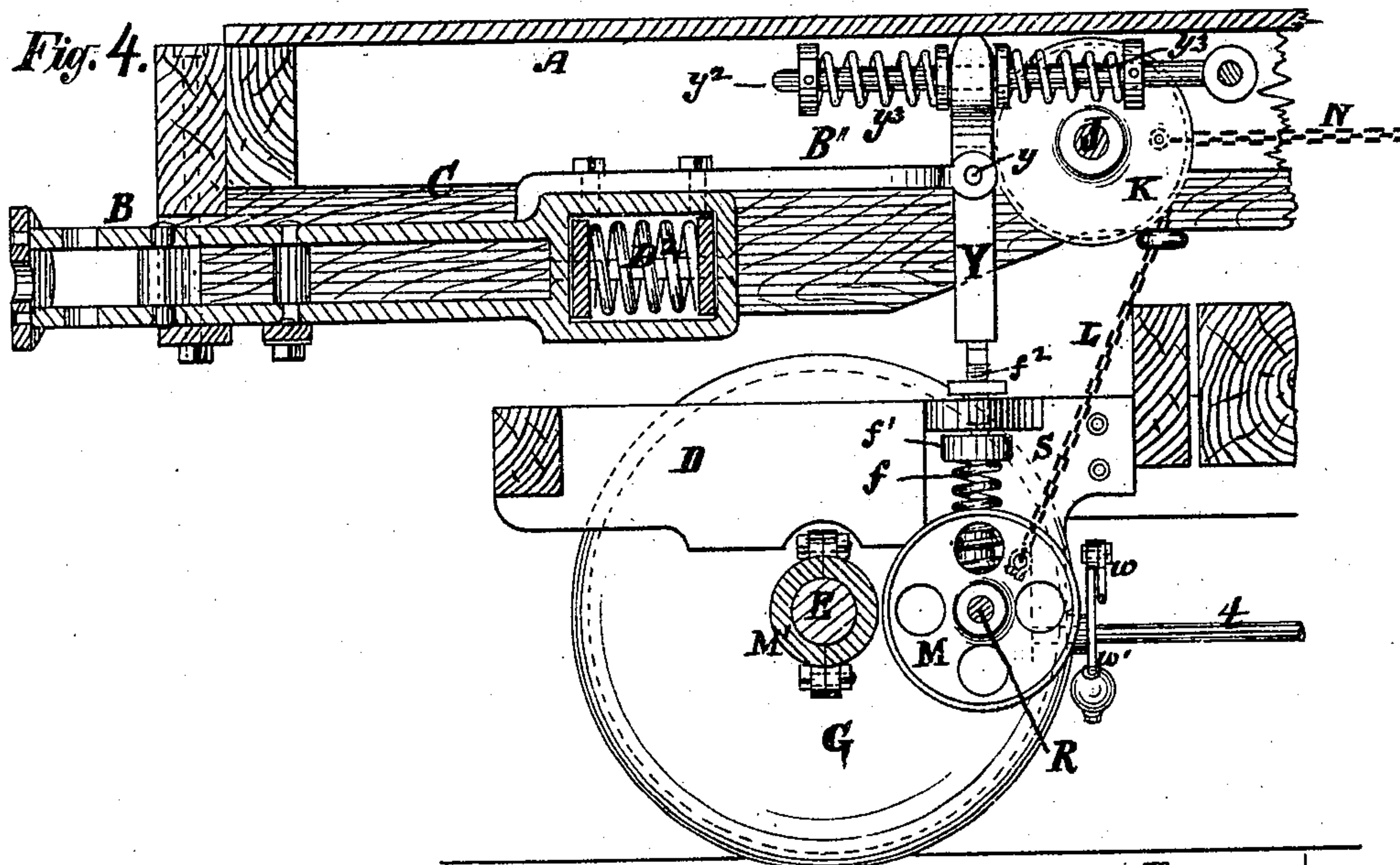
(No Model.)

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No. 245,576.

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5 Sheets—Sheet 4.

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Fig. 6.

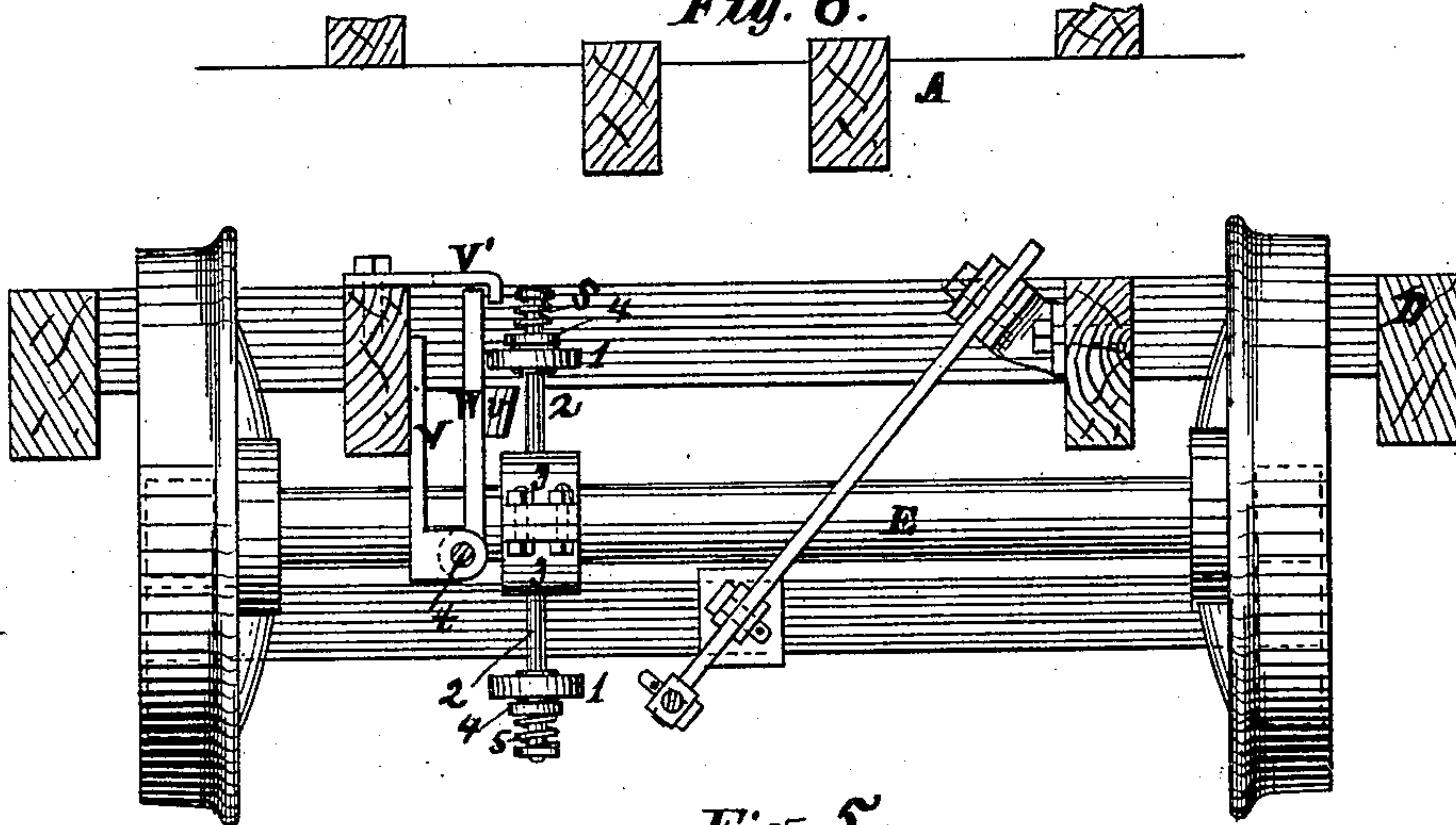


Fig. 5.

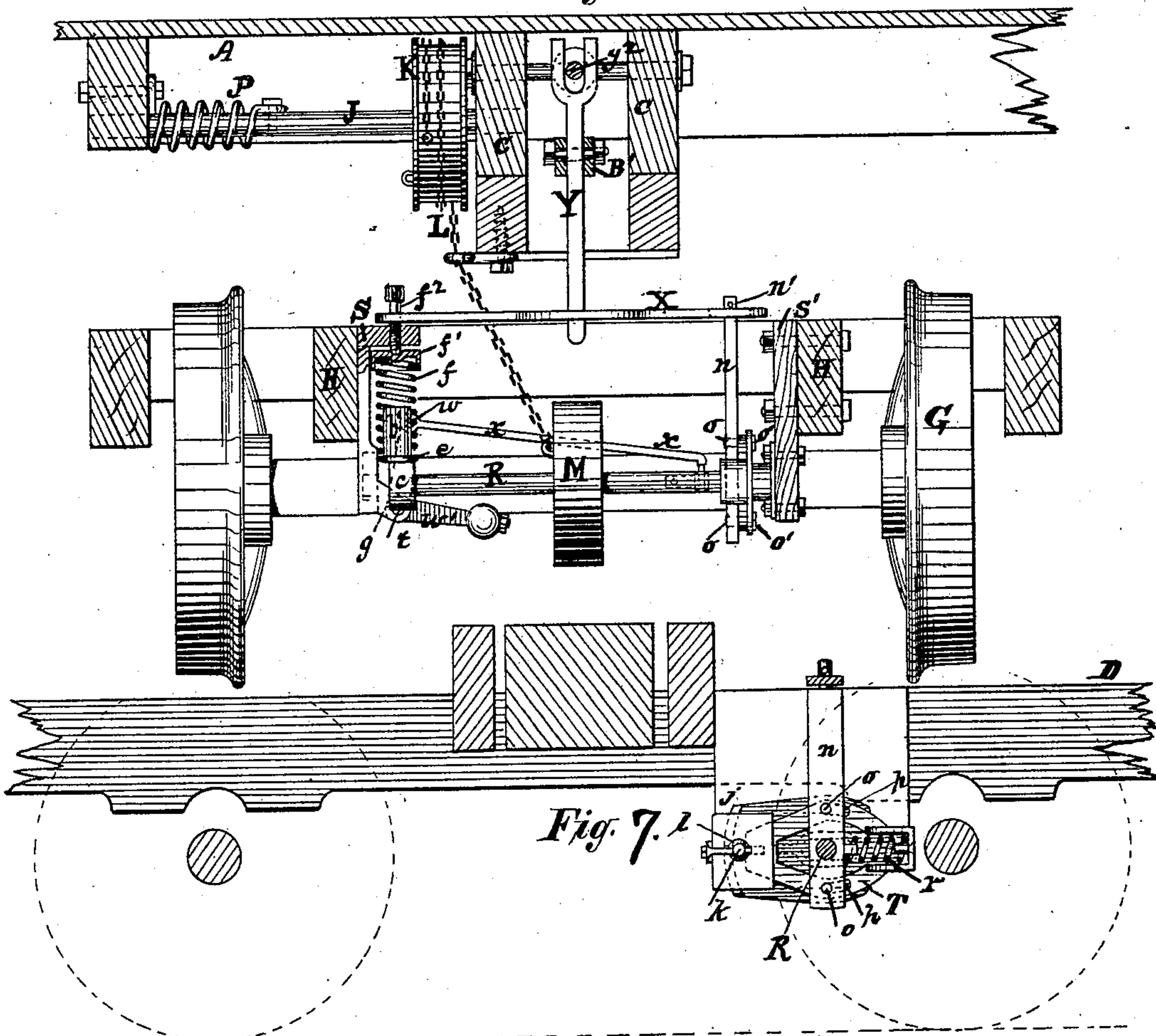


Fig. 7.

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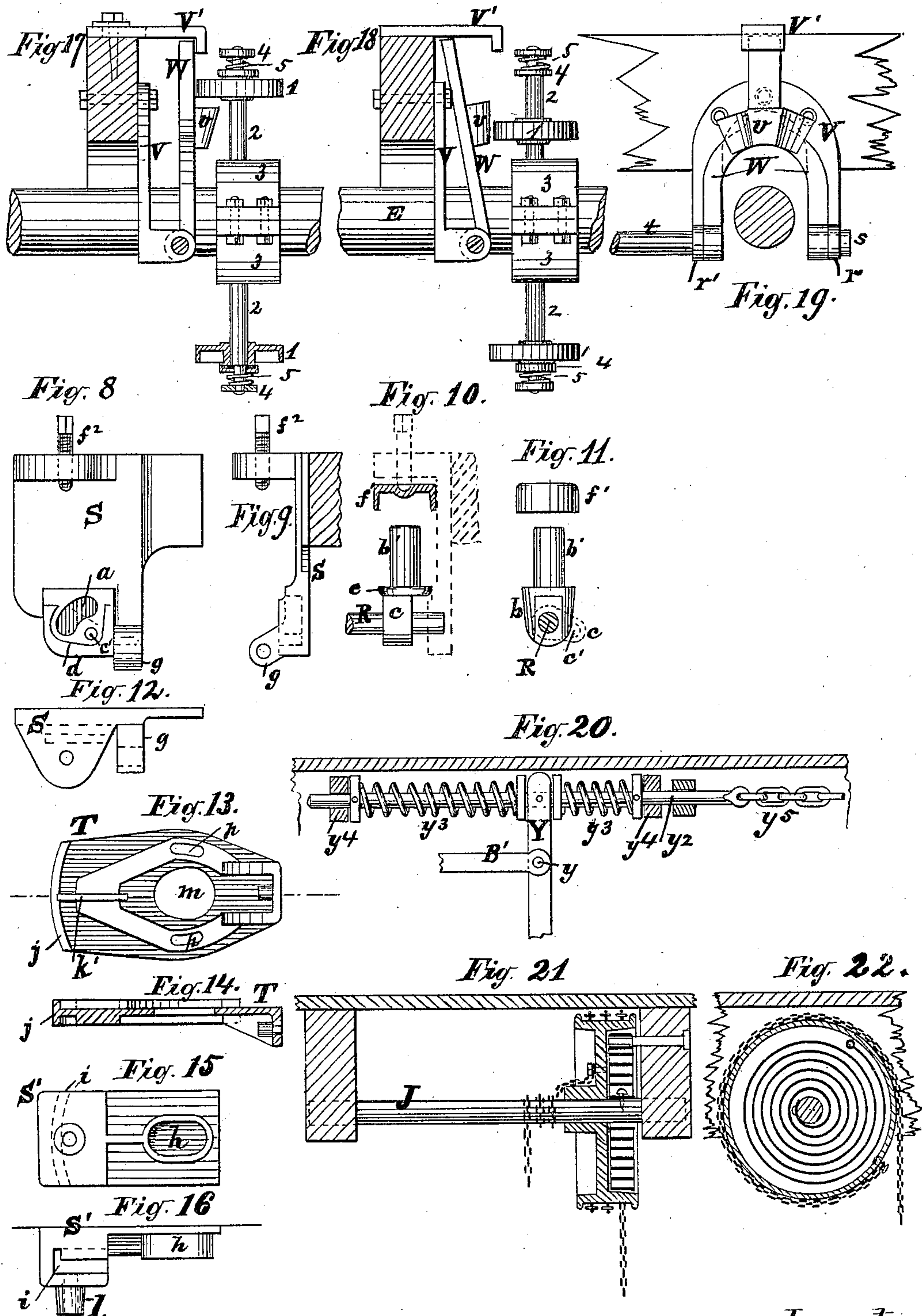
(No Model.)

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B. L. STOWE.
AUTOMATIC CAR BRAKE.

No. 245,576.

Patented Aug. 9, 1881.



Witnesses:

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UNITED STATES PATENT OFFICE.

BENJAMIN L. STOWE, OF NEW YORK, N. Y., ASSIGNOR TO J. VAN D. REED,
OF SAME PLACE.

AUTOMATIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 245,576, dated August 9, 1881.

Application filed November 11, 1880. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN L. STOWE, of the city, county, and State of New York, have invented certain new and useful Improvements in Automatic Car-Brakes for Railway-Cars, of which the following is a specification.

This invention has relation to automatic brakes for railway-cars.

The improvements about to be described are applicable in great measure to automatic car-brakes in general, but are here shown as adapted to the automatic double-acting system set forth in my Letters Patent Nos. 231,115 and 231,116.

The automatic car-brake illustrated in the accompanying drawings is one of that class of such brakes in which friction-rollers, one upon the car-axle and one upon the brake-shaft, cause the brake-chain to be wound upon the brake-shaft at required times by their being brought into contact one with the other by the motion of the draw-bar of the car. In brakes of this class difficulty has been experienced in causing the chain to be unwound from the brake-shaft when the brake is released without the use of strong springs to crowd the brake-shoes away from the wheels; and these stiff springs take so much from the power of the hand-brake, when it is necessary to use that, that they are objectionable upon that account.

My object is to provide a spring that shall act upon the automatic-brake shaft and cause the chain to be unwound whenever the brake is released without interfering in any way with the action of the hand-brake. This I accomplish by combining with the automatic-brake mechanism a spring, (termed by me a "throw-off spring,") which is put under tension when the brake is applied, and which is attached to or connected with the automatic-brake mechanism at some point intermediate between the device that imparts power to the automatic-brake mechanism and the point at which the hand-brake rod is attached to the brake-mechanism under such an arrangement that it will act only upon the automatic-brake-applying mechanism and not upon the hand-brake connections.

My invention further relates to means for limiting the amount of brake-power that is au-

tomatically applied; and to this end it consists in combining with the automatic-brake-applying mechanism a spring which, when the strain upon the brakes exceeds a certain limit, will yield to permit the separation of communicating parts of said mechanism far enough to prevent the transmission of further power to the brakes, while at the same time keeping the brakes applied.

My invention consists, further, in various details of construction and arrangement, which can best be explained and understood by reference to the accompanying drawings.

In these drawings, Figure 1 is a vertical central section of so much of a railroad-car as needed to illustrate my invention. Fig. 2 is a plan of the same parts in section, with the car-frame removed in order to more clearly show the brake-applying mechanism. Fig. 3 is a plan of the front portion of one truck. Fig. 4 is a longitudinal vertical section of the same. Fig. 5 is a transverse vertical section, partly in elevation, of the front portion of the truck and frame in Fig. 1. Fig. 6 is a like section through the rear part of said truck. Fig. 7 is an elevation, partly in section, showing the arrangement of the movable casting T and lever n, hereinafter referred to. Figs. 8, 9, 10, 11, 12 are detail views representing the casting S and parts immediately connected with it. Figs. 13, 14 are like views of the casting T. Figs. 15, 16 are an elevation and plan, respectively, of the bracket which receives the casting T. Figs. 17, 18, 19 are detail views of the centrifugal or gravity mechanism. Figs. 20, 21, 22 are views of modifications hereinafter referred to.

A is the car-frame; B is the draw-bar; C is the draw-timbers; D is the truck-frame; E are the axles; F are different parts of the hand-brake; G, the wheels; H, the safety-beams, all of which are similar to those already in use.

I is a centrifugal—or, more properly, a gravity—arrangement, (shown in detail in Figs. 17, 18, 19,) and similar in its action to those described in my previous Letters Patent Nos. 231,115 and 231,116.

Otherwise my improved brake consists of brake-shaft J, having a bearing at one end in the draw-timber and at the other in the car-

frame. Upon the end of this shaft nearest to the draw-timber is a flanged pulley, K; and a chain, L, secured to the periphery of this pulley, is wound once or twice about it, and then reaches down and is connected to an eyebolt in the side of friction-pulley M. Another chain, N, is fastened to the side of pulley K, and then reaches out and is fastened to the end of the equalizing-lever O at the same place as the hand-brake rod. A spring, P, (the throw-off spring hereinbefore referred to,) is coiled loosely about the shaft, and one end is fastened to the car-frame and the other to the shaft J in such a way that it is wound up or tightened when the chain is wound upon the shaft and unwound when the chain is unwound.

R is another brake-shaft, having a bearing at either end in castings SS', fastened to the safety-beams H. This shaft carries the friction-pulley M, and there is another friction-pulley, M', clamped upon the axle directly opposite to it. The casting S, supporting one end of the lever brake-shaft, (see detail views, Figs. 8, 9, 10, 11, 12,) is bolted to one of the safety-beams. The shaft R enters an oblong curved recess, *a*, near the bottom of the casting. It also passes through a bearing, *b*, and a link, *c*. The link is pivoted at *c'* to the casting in such manner that when the shaft is raised the link will cause the end of shaft to follow in the recess *a*. This link, when in its lowest position, rests upon a shoulder, *d*, upon the casting. A shoulder, *e*, on the bearing *b* rests upon this link, and the hole through the bearing is large enough to allow the shaft to pass through it without coming into forcible contact with its sides, so that as the bearing is pressed downward by what I call the "relief-spring," *f*, which fits over the plug *b'* of the bearing, and rests upon the shoulder *e* at its lower end and enters a cap, *f'*, at its upper, the said cap being forced downward by a set-screw, *f''*, passing through a lug upon the casting, the bearing will not rest directly upon the shaft, but will impart its downward pressure to the end of the shaft through the medium of the link. Another lug, *g*, upon the casting affords a bearing for one end of a shaft, to be hereinafter described. The other end of the lever brake-shaft R enters the oblong recess *h* in the casting S', Figs. 15, 16, the said casting being bolted to the other safety-beam. In a curved guide slot or recess, *i*, in one end of this casting the end or oscillating casting, T, Figs. 13, 14, fits loosely, the flange *j* entering the recess *i*, and the end of a sliding pin, *k*, that passes through the boss *l*, rests against the inner edge of the flange upon the casting in such position that the stop-piece *k'* on the casting T will cross its pathway when movement is given to the casting. The end of the shaft passes through the opening *m* in the casting T and forms a support for the said casting. A vertical lever, *n*, is placed directly against the casting T, the shaft R also passing through it, (see Fig. 7;) and two studs, *o*, fastened securely in the lever, passing loosely

through the slots *p* in the casting, and having heads *o'* upon the back of the casting, serve to maintain the lever in its position. A spring, *r*, placed between this lever and the casting, tends to keep the lever back with the studs against the rear ends of the slots *p*.

The pin *k* is made to slide in and out in its bearing *l*. When it is out it allows the casting T to partake of whatever motion the lever *n* may have; but when it is in, it obstructs the passage of the stop-piece *k'* and causes the lever to make one or the other of the stop-pins *o* its fulcrum, according to the direction of the lever's movement, and to apply a forward movement to the brake-shaft, the spring *r* being compressed. It will be seen that a movement of the lever *n* in either direction produces a like effect upon the end of the shaft R—that is, if the upper end of the lever *n* is moved forward after the movement in corresponding direction of the casting T is stopped by the pin *k*, the lower stud *o* becomes the fulcrum, and when the lever *n* is moved backward and the like movement of the casting is prohibited by the pin *k* the upper pin *o* becomes the fulcrum; but in either case the result is the same and the shaft R is pressed forward.

The gravity or centrifugal arrangement is similar in principle and action, though of a modified form, to that described in Letters Patent of the United States Nos. 231,115 and 231,116. In my present invention I employ preferably two weights or wheels, 1, that slide freely upon their respective arms 2 between the castings 3 and the collars 4. The collars 4 and springs 5 serve to cushion the blow of the falling weights upon the end of the arms. I prefer to clamp this arrangement upon a different axle of the same truck from that upon which the friction-drum is clamped.

A casting, V, bolted to a safety-beam, has two lugs, *r*, at its lower extremities. A fork, W, has lugs upon it to correspond to the lugs *r'*, and a pin, *s*, passes through the two upon one side and a shaft, *t*, through the two at the other, forming a working-point. A cam, *v*, is fixed to this fork at a proper height to allow the weights 1 to pass clear of it when thrown out by centrifugal force, but to be in their pathway whenever they shall have fallen a certain distance toward the center before they come into contact with it. When the cam is in the pathway of the wheel-weights it is pressed backward by them.

It should be understood that this mechanism does not depend entirely upon centrifugal force to operate it, as it is more properly a gravity arrangement, and the speed at which it may be made to operate depends upon the shape and size of the wheels and cam, and not upon the centrifugal form—as, for instance, if the wheels be large and the cam long, the axle must revolve at a very low speed (so low as to almost entirely overcome centrifugal force) to give the weight sufficient time to slide in upon the arm after the arm leaves a horizon-

tal position and before the weight reaches the cam. If it has not time, the weight will fall upon the top of the cam and will slide over it without crowding it back. In this case the
 5 only advantage of centrifugal force is that it renders the action noiseless. A hooked stop-piece, V' , reaches out from the safety-beam and limits the forward movement of the fork W .

The shaft t passes freely through the lug r' of casting V , but is keyed to the fork W . The other end of said shaft t rests in the bearing g of the casting S . A piece having two arms, w w' , is keyed to the shaft t . One of these arms, w' , is weighted and serves to hold the
 15 fork forward. From the other, w , an arm, x , reaches out to the pin k and passes through it, as shown in dotted lines in Fig. 5, the whole forming a connection by means of which the weights are made to draw the pin at desired
 20 times, and by which said pin is forced in again when the weights are not operating.

A horizontal lever, X , reaches from the casting S to the lever n at about the level of the tops of the safety-beams. It is pivoted at one
 25 end upon the set-screw f^3 , and through a slot, x' , at the other end the upper end of the vertical lever n passes, the lever being reduced in size so as to form shoulders for the horizontal lever to rest upon. (See Fig. 7.) A pin,
 30 n' , passes through the vertical lever above the horizontal one and prevents the latter from rising off from the other. The horizontal lever X has a longitudinal slot, x^2 , at its center. This slot is curved to a radius of which
 35 the center-pin or king-bolt of the truck forms the center. The lower end of another vertical lever, Y , enters said slot. This lever is supported between the draw-timbers by an arm, B' , reaching out from the rear of the draw-
 40 bar, and to which arm the lever is pivoted at y . A rod, y^2 , passing through a hole in its upper end, is securely fastened at one or both ends to the draw-timbers. Spiral springs y^3 , nuts, and collars hold the upper end of the le-
 45 ver, so that the lever is about vertical when no pressure is exerted upon the draw-bar. The springs—one or the other—compress to admit of a forward or backward movement of the draw-bar that shall exceed the amount re-
 50 quired at the lower end of the lever to actuate the brake movement. One spring is usually made to serve the purpose for which, for convenience of illustration, I have shown the two here.

55 Having now described the different parts of my improved brake, I will next proceed to describe the method of its operation.

We will suppose that at the present time the car is at rest, but that it is about to be pulled
 60 forward. To do this the draw-bar must be drawn upon sufficiently to compress the draw-spring B^2 slightly. This will draw, by means of the arm B' , upon the lever Y and cause its lower end to be thrown forward against the
 65 front of the slot in the horizontal lever X , and this latter will then be pushed forward and car-

ry with it the top of the upright lever n . This lever will impart its motion to the casting T , which, if the pin k be withdrawn, will be carried about enough to allow the pin to fall below
 70 the stop-piece k' when it enters. If the pin should not be withdrawn, the stop-piece will come against it, and there remain until the axle has made not to exceed one-half a revolution, when the pin must be withdrawn by the action
 75 of the weights on the cam v and allow the stop-piece to pass. The pin will continue to draw and fall back so long as the speed of the train does not exceed the limit at which the weights are set to operate—say about one mile an hour.
 80 When the speed shall exceed that the pin will enter below the stop-piece, and the brake mechanism is in readiness to act whenever the draw-bars shall receive an inward thrust. Now, if a brake be applied to the engine or to the cars
 85 in advance of this one, the draw-bar will receive such a thrust, and the result will be that the vertical lever Y , the horizontal lever X , and the upper end of the upright lever n will be crowded back. The casting T will partake of
 90 the motion of the lever until the stop-piece k' strikes the pin k , when the upper stud o will become a fulcrum, and the end of the brake-shaft R will be pressed forward sufficiently to bring the friction-pulleys M M' , which are set
 95 a little way apart, into contact and cause the revolving motion of the friction-roll upon the axle to be imparted to the one upon the brake-shaft. This will cause the chain L to be wound
 100 up on shaft R quite fast at first, in consequence of the chain being fastened near the rim of the pulley M , and slowly afterward, when it winds upon the shaft R . This will continue until the requisite pull upon the chain N is obtained, when a further strain will overcome the pres-
 105 sure of the spring f against the link c , and will allow the shaft R to rise. As the shaft rises the link draws it backward and causes the pulleys to be drawn apart sufficiently to stop any greater pulling upon the chain. It will be seen
 110 that by these means the tension of the spring f is made to perfectly control the amount of brake-power obtained. As the chain L is wound upon the shaft R it is unwound from the pulley K upon the shaft J above, and the chain N
 115 is wound upon the upper shaft, J , like the other chain, L , fast at first and slower afterward. This chain N pulls directly upon the equalizing-lever and applies the brake in the same manner as the hand-brake. While this chain
 120 N is being wound up the spring P about the shaft J is being tightened, so that when the brake is applied the spring P applies considerable power to the shaft J . The brake is now applied, and will continue so until either the
 125 inward pressure upon the draw-bar is relieved or until the speed of the train is sufficiently reduced to allow the weights 1 to draw the pin. When from either of these causes the pulleys M M' are allowed to separate, the chain N will
 130 immediately unwind by reason of the great strain upon it, assisted by the spring P upon

the upper shaft. The chains being fastened to the pulleys at a distance from the center renders it easier for the chains to unwind when the force is nearly expended.

5 The action of the spring P and the manner of fastening the chains have been found to obviate a difficulty that could not be otherwise satisfactorily overcome in brakes of this class—viz., the tendency of the brake to only partially release itself. If the train is backed, the
10 draw-bar will be pushed in when the train starts, and the levers will partake of this movement, and the pin will fall in above the stop-piece, and the mechanism will be so adjusted
15 that an outward pull upon the draw-bar will apply the brake in precisely the same manner as an inward thrust when the car had been started by a pull upon the draw-bar, instead
20 of the push that it required to shut it in this instance, except that now the lower stud o will act as the fulcrum.

It is obvious that the action of the draw-bar upon the brake will be the same whether it is at the forward or the rear end of the car, and that
25 but one set of mechanism is required; but, if desired, the connection may be made with the draw-bar at the other end of the car. To do this the rod y^2 , instead of being fastened rigidly to the draw-timbers, passes through the holes
30 in the supports y^4 , which are fastened to the draw-timbers, as shown in Fig. 20, these supports being placed one at either end of the spring y^3 , and the lever Y being pinned to the rod y^2 , so that the lever and rod move together,
35 and either one or the other of the spiral springs is compressed between the lever and one or the other of the supports when the lever is pushed or drawn. Now, if a rod or chain, y^5 , be carried from
40 the end of this rod to the other draw-bar, a pull upon that draw-bar will cause the upper end of the lever to be thrown back at the same time as the draw-bar at this end causes the lower end to be thrown forward, and the motion of the lever will be thereby increased. It
45 is preferred to use one of the springs longer than the other. (See Fig. 20.)

A spring similar to a clock-spring (see Figs. 21, 22) may be used instead of the coil-spring P about the shaft J.

50 The described brake arrangement may be made single-acting—that is, to operate only when the car receives its momentum by a pull upon the draw-bar—by resisting the forward movement of the horizontal lever X to a degree that shall allow the pin k to drop below
55 the stop-pin, when the lever is drawn forward as the train starts, but without sufficient motion to bring the pulleys M M' into contact when the pin is upon the upper side of the
60 stop-pin k' .

I do not restrict myself to the exact construction of the relief arrangement consisting of a spring-bearing and link, as described, for it is manifest that the spring may be otherwise applied for the purpose of limiting the
65 amount of brake-power.

I remark, also, that I do not restrict myself to the particular arrangement herein shown of the throw-off spring. It is manifest that it may be applied at various points in the automatic-brake mechanism between the point O,
70 at which the hand-brake is connected, and the lower brake or friction-roller shaft, R, the essential feature being that it shall act in the manner hereinbefore indicated on the automatic-brake-applying mechanism without influencing or offering any obstacle to the application of the hand-brake.
75

By connecting in the manner described the chain L to the pulley M and the chain N to the drum K, these chains will, as hereinbefore
80 said, be wound up quite fast at first and more slowly afterward. I thus take up the chains more rapidly at the time when less power is required for the operation, and then cause the
85 winding to take place less rapidly, but with greater power, in this way increasing the efficiency of the brake-applying mechanism.

Hooks or lugs or irregular-shaped pulleys may be used to take up the chains faster at
90 the first, and thereby serve the same purpose as fastening the chains away from the center. Set-nuts may be placed upon the bar connecting the vertical lever Y with the push-bar, for the purpose of adjusting the position of the
95 lever, instead of using the nuts upon the rod y^2 , carrying the springs.

A continuous chain running from a small grooved pulley upon the lower brake-shaft to a similar larger one upon the upper shaft may
100 be employed instead of the single chain, as described.

Having described my improvements, what I claim, and desire to secure by Letters Patent, is—
105

1. The combination, with the axle and friction-roll thereon and the friction-pulley brake-shaft, operated to move to bring its pulley or wheel into contact with the friction-roll on the axle at the times and in the manner substantially as hereinbefore described, of the relief-spring, arranged and operating to permit said shaft to recede from the axle when the strain upon the brakes exceeds the prescribed limit, substantially as and for the purposes herein
110 set forth.

2. The combination, with the lower brake or friction-pulley shaft and the upper automatic brake or winding shaft, of the connecting-chain attached to the lower shaft, substantially as
120 hereinbefore described, whereby the said chain, in applying the brakes, is wound up rapidly at first and more slowly afterward.

3. In combination with the upper automatic brake or winding shaft and the equalizing-lever, the connecting-chain attached to said shaft, substantially as hereinbefore described, so that when the brakes are applied it shall be wound up rapidly at first and more slowly afterward.
125

4. The combination, with the two shafts R J and the brake mechanism operated thereby,
130

of the chains connecting said parts to one another, and the brake mechanism, arranged substantially as hereinbefore set forth, so that in applying the brakes they shall wind up rapidly at first and more slowly afterward.

5 5. The combination, with the lower brake or friction-pulley shaft, of the castings S' T, lever *n*, stop-pin *k*, and their adjuncts, said parts being arranged for joint operation substantially as hereinbefore set forth.

10 6. The combination, substantially as hereinbefore set forth, with castings S' T, lever *n*, stop-pin *k*, and their adjuncts, of the levers X and Y, the equalizing-rod, and spring or springs controlling the latter and the draw-bar.

15 7. The combination, substantially as hereinbefore set forth, of the lower brake or friction-pulley shaft, the casting S, the relief-spring and bearing, and link *c*, the castings S' T, lever *n*, and stop-pin *k*, and their adjuncts, the upper brake or winding shaft, and the levers X Y.

20 8. The combination, substantially as herein described, with the lower brake or friction-pulley shaft, R, of the upper brake or winding shaft, J, said parts being connected with one another and with the brakes in the manner substantially as hereinbefore set forth.

25 9. The combination, with the wheel-weights and their supporting arms and springs, of the vibrating cam-yoke, the weighted rock-shaft *t*, link *x*, and stop-pin *k*, substantially as hereinbefore set forth.

10. The combination, with the equalizing-lever and hand-brake rod attached thereto, of the automatic brake or winding shaft connected with said equalizing-lever and the throw-off spring connected to the brake-applying mechanism, substantially as herein described, so as to be put under tension only when the automatic brake-shaft is operated to apply the brakes.

11. The combination, with the automatic brake-applying mechanism and the throw-off spring, of the hand-brake rod connected with said mechanism at a point intermediate between the brake-shoes and point at which the throw-off spring is attached to said mechanism, substantially as and for the purposes hereinbefore set forth.

12. In an automatic brake of the kind described, a spring so arranged that tension upon it shall be applied or increased when the automatic brake is applied, and shall be released or lessened when the automatic brake is released, for the purpose of assisting in the release of such brake, said spring to act upon the automatic brake, and not upon the hand-brake, substantially as specified.

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Witnesses:

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