(No Model.)

4 Sheets—Sheet 1.

B. L. STOWE.

CAR BRAKE.

No. 272,098. Patented Feb. 13, 1883.

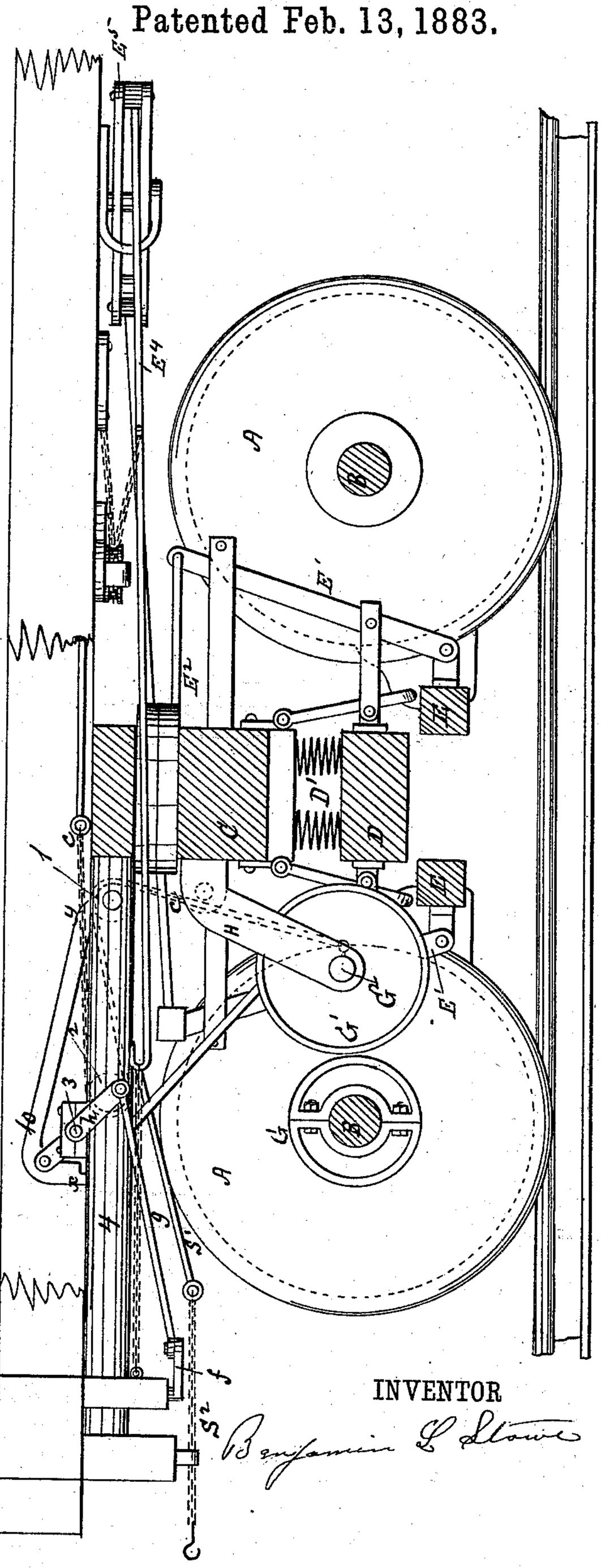

Fig. 1.

WITNESSES:

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F. A. Stowe

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Benjamin L. Stowe

(No Model.) 4 Sheets—Sheet 2.

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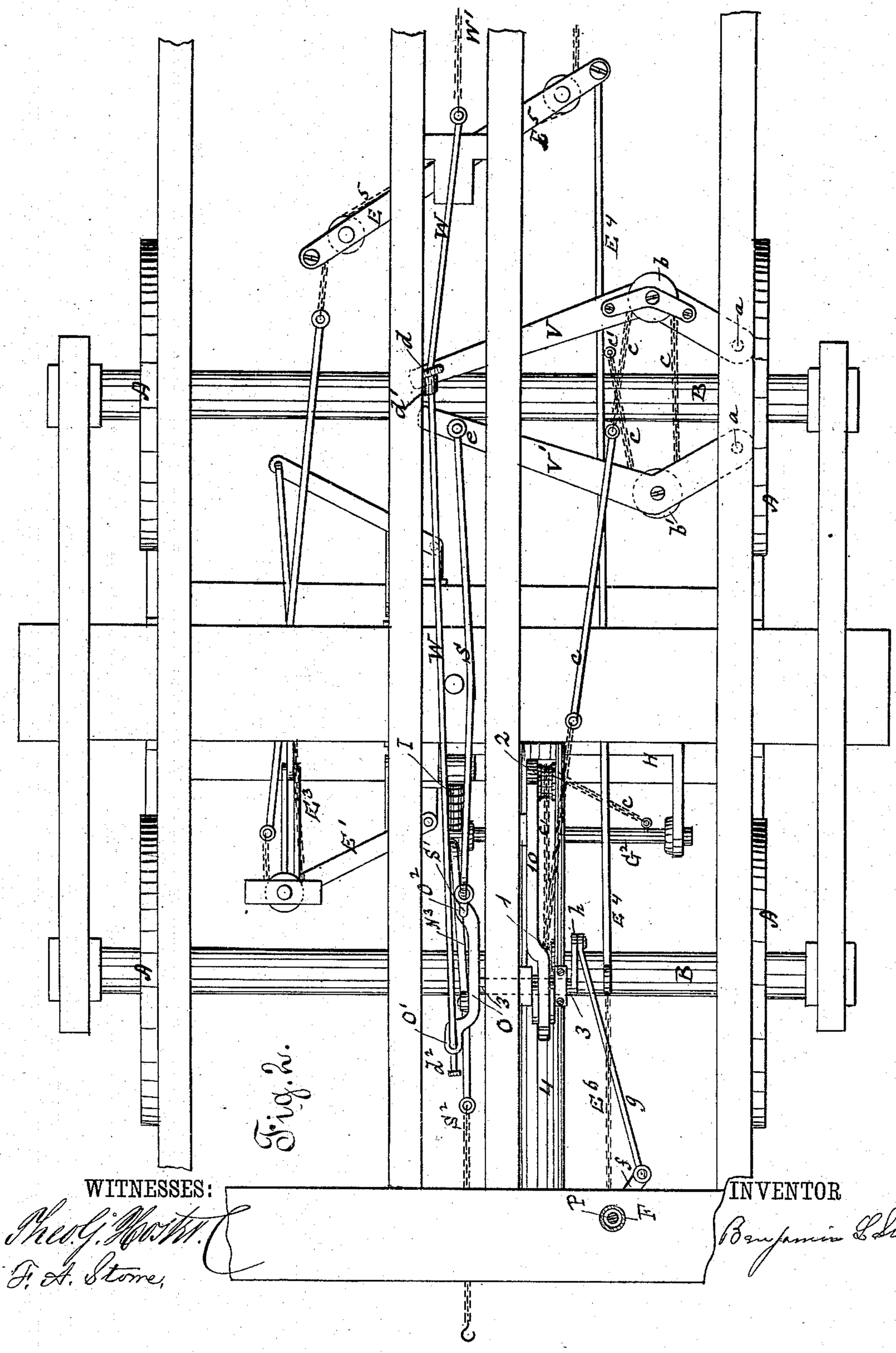

Fig. 2.

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4 Sheets—Sheet 3.

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No. 272,098. Patented Feb. 13, 1883.

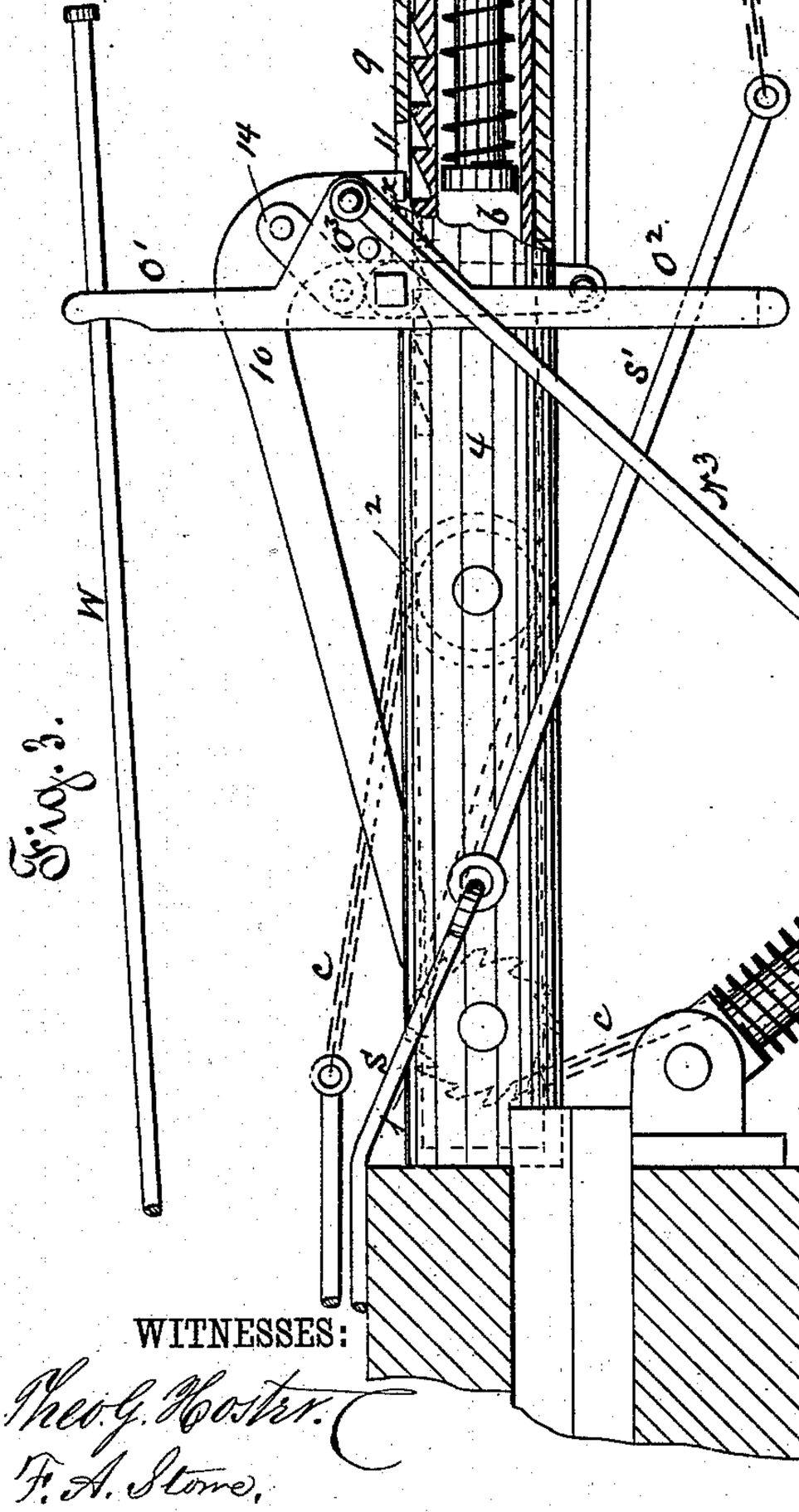

Fig. 5.

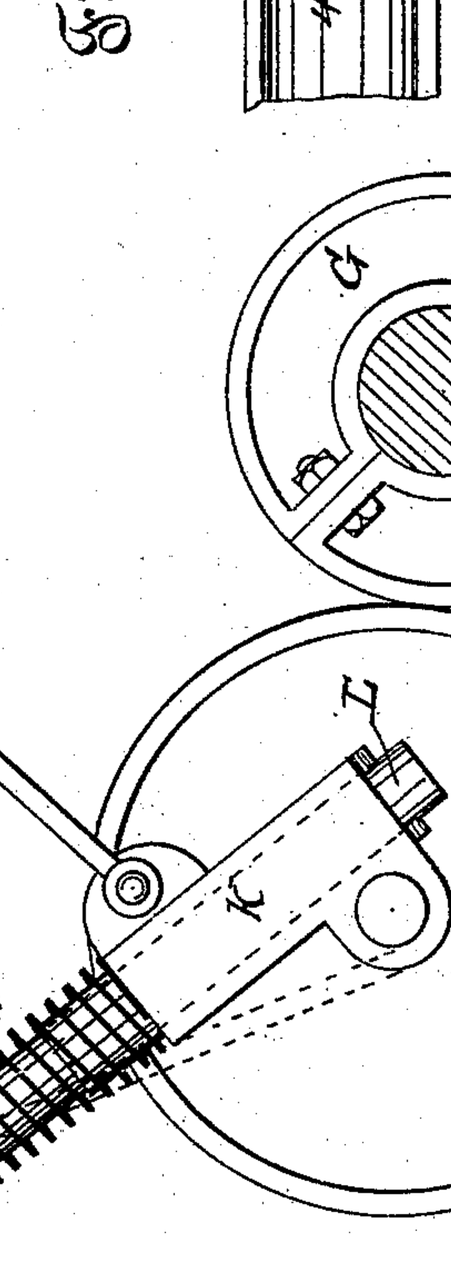

Fig. 4.

Fig. 3.

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(No Model.)

4 Sheets—Sheet 4.

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CAR BRAKE.

No. 272,098. Patented Feb. 13, 1883.

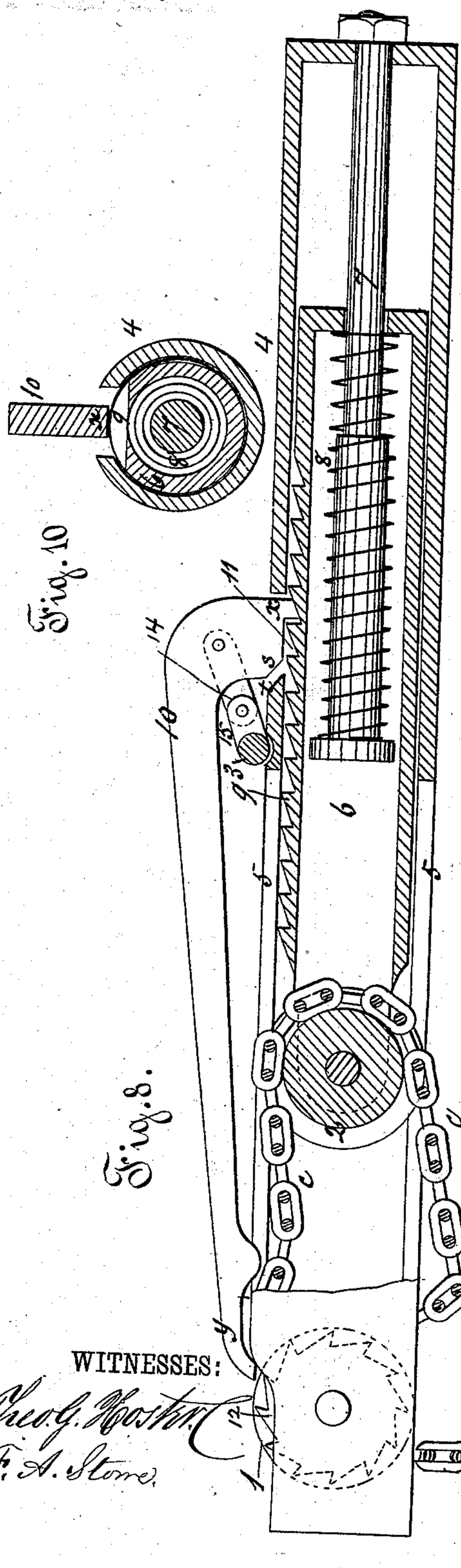

Fig. 10

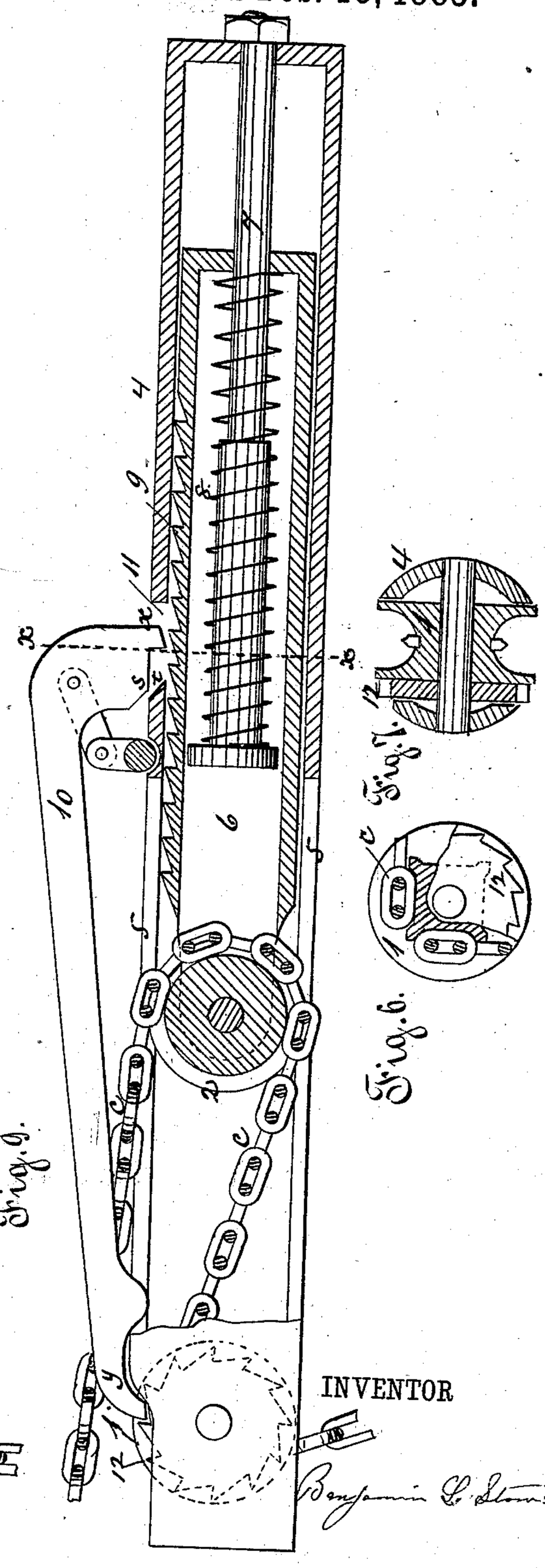

Fig. 7.

Fig. 6.

Fig. 8.

Fig. 9.

WITNESSES:

Theo. G. Hoster.

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UNITED STATES PATENT OFFICE.

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

CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 272,098, dated February 13, 1883.

Application filed July 6, 1882. (No model.)

To all whom it may concern:

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

My invention has reference to that system of railway-car brakes in which the brake-applying mechanisms of the several cars composing a train are operated each from some moving part of its car; and it has more particular reference to a train-brake of this general kind in which the brake-applying mechanisms of the several cars are combined with draft intermediate mechanism operated by the brake-applying mechanism of one car to bring into action the brake-applying mechanism of the next adjoining car or cars. A train-brake of this kind is described fully in my application for Letters Patent filed in the United States Patent Office January 23, 1882, Serial No. 50,768.

My invention consists of certain improvements upon this brake. The principal feature resides in an arrangement for automatically storing power for use at required times to effect instantaneous application of the brakes of a car. I have also modified and improved the construction and arrangement of portions of the brake mechanism, without, however, changing the principle which underlies the action of the brake.

Figure 1 is a sectional side elevation of a portion of a car and truck with my improved brake attached. Fig. 2 is a plan of the same. Fig. 3 is a sectional side elevation, on an enlarged scale, of the power-storing mechanism detached. Fig. 4 is a longitudinal central section of a portion of the storage-cylinder, with the inner ratchet tube or cylinder shown in elevation. Figs. 5 and 6 are sectional elevations of the sprocket-wheel and its ratchet. Fig. 7 is a cross-section of the same and of the storage-cylinder in which it is mounted. Figs. 8 and 9 are detailed views, in longitudinal central section, of the storage-cylinder and parts immediately connected therewith. Fig. 8 represents the parts in the position which they occupy when the brakes are off and the power is stored and ready for use. Fig. 9 represents the same in position which they assume when the brakes are applied by the stored power or by such portion of the power as required for that purpose. Fig. 10 is a cross-section on line *x x*, Fig. 9.

The parts of the car-frame shown, together with the wheels A, axles B, truck-bolster C, spring-plank D and springs D′, brake-beams E, brake-levers E′, connecting-rods E^2 E^3 E^4, and central brake-lever, E^5, are of usual construction, and require no further description.

Upon one of the axles is fixed the friction-drum G, and adjoining it is the friction-brake shaft G^2, with its drum G′, said shaft being supported in bearings carried by a bracket, H, and having combined with it a relief-spring, I, in substantially the same manner and for the same purpose as described in my application for Letters Patent hereinbefore referred to. It is unnecessary to describe the operation of these parts further than to say that when the drums G G′ are drawn together while the train is in motion the friction-brake chain *c*, which is connected to brake-rod E^4 at *c′*, is wound upon the brake-shaft G^2, and the brakes are thus applied, the relief-spring I operating to limit the power of the brake, as described in my Letters Patent No. 250,852, of December 13, 1881.

In lieu of using a single compensating-lever, as described in my application for Letters Patent hereinbefore referred to, I employ two, lettered V V′. They are bent or elbow levers, each pivoted at a point, *a*, to one of the floor-timbers of the car in the position substantially as indicated in Fig. 2. The levers are provided at their elbows with sheaves *b b′*. The friction-brake chain *c*, which at one end is fastened to the shaft G^2, as seen in Fig. 2, passes thence around the sprocket-wheel 1 and sheave 2 of the power-storing mechanism, (to be hereinafter described,) and thence around sheaves *b b′*, from the latter of which it goes to the point *c′*, where it is fastened to the brake-rod E^4.

The rods W S of the draft mechanism are connected, the one, W, to lever V by means of an eye, *d*, on the free end of the lever, through which the rod passes, a collar, *d′*, being fixed on the rod to act as a shoulder, so that when

the rod is pulled far enough it will, by reason of the bearing of the shoulder or collar d' against the eye d, pull the lever outward. The other draft-rod, S, is pivoted or pinned at e to the lever V'.

A three-armed lever, O, corresponding in function to the similarly-lettered lever in my aforesaid application for Letters Patent, is fastened vertically upon a horizontal cross rocking shaft, 3, supported in suitable bearings. Through a slot in the arm O' passes the end of rod W, which has on it a head, d^2, larger than the slot is wide. Through a slot in arm O^2 passes a link-rod, S', united by an eye-connection at one end to rod S and at the other end to chain S^2. The eye is of a size to prevent it from passing through the slot in arm O^2. To the third arm, O^3, is pinned a connecting-rod, N^3, jointed at the other end to the journal-bearing K of shaft G^2, which is mounted on the hinged shaft L, and is otherwise arranged as described in my aforesaid application for Letters Patent. The chain S^2 is to be hooked to a chain on the adjoining car, corresponding to the chain at the end of rod W (marked W',) and chain w' is to be hooked to a chain on the next car, corresponding to S^2. The lever O is shown in Fig. 2 in the position which it occupies when the brakes are off and in Fig. 3 in the position which it assumes when the brakes are on. Supposing the rod W to be pulled outwardly to a sufficient extent, its head d^2 will pull the lever over to the position shown in Fig. 3. By this means the two drums G' G are brought into contact, and the friction-brake chain c is wound upon the shaft G^2, thus applying the brakes. At the same time the lever V is moved in a direction to pull on the rod S, and thus through the instrumentality of the connecting-chain S^2 and the corresponding draft mechanism of the adjoining car a pull is transmitted to the brake-applying mechanism of that car, which will bring the friction-drum of said mechanism into operative connection, and so on through the train. A similar result will be obtained by pulling on the chain S^2 instead of the chain W'.

The friction-brake mechanism can be brought into operation by a brakeman stationed on the car by means of the friction-brake shaft P, which passes down through the hollow hand-brake shaft F, and has at its lower end a crank-arm, f, connected by a connecting-rod, g, to a crank-arm, h, on the cross-shaft 3. The hand-brake is connected by a chain, E^6, to the brace-rod E^4, so that the brakes can be applied by hand, if necessary.

The mechanism thus far described in arrangement and mode of operation is substantially the same as that described in my aforesaid application for Letters Patent, and requires no further description save with respect to the compensating-lever mechanism.

When the friction-brake-applying mechanism is brought into action by a brakeman on the car through the instrumentality of the brake-shaft P the friction-brake chain c will, when it winds up, exert an equal pull on both levers V V', with the effect of drawing them together, and consequently of exerting an equal pull on both connecting-rods W S, the result being that an equal pull is exerted upon the draft-rods of adjacent cars at each end, thereby bringing the friction-brake mechanism of those cars into action. Thus under these conditions the brakes will be applied not only to the car on which the brakeman is stationed, but also to all of the other cars in the train, both in front and rear of him as well; but when the brakes of the car are applied by a pull upon either of the rods W or S the conditions must not be the same. The leverage of V and V', instead of being equal, as in the case just described, must be unequal. In other words, supposing that rod W is pulled, then the chain c must have less leverage on the lever V of rod W than it has on lever V' of rod S, the object being to restore to the draft system the power consumed by it in operating the three-armed lever. This is accomplished by the arrangement shown in the drawings.

The power-transmitting instrumentality which imparts movement to the successive portions of the draft mechanism is the friction-brake chain c, and the points at which it is applied to the levers are represented by the sheaves b b'. When the rod W is pulled out it will pull back the lever V, while the lever V' remains in its normal position. The effect of thus pulling back the lever V will be in effect to bring the point b, at which the chain c applies its power, near to the fulcrum a, thus decreasing the leverage. The chain, when wound up, will consequently have greater leverage on the lever V' than on lever V, and consequently, while the pull upon the latter is considerably reduced, the pull upon the former in the direction necessary to operate the brake mechanism of the next succeeding car is not reduced, but is as much in amount of power as the draft exerted by the rod W on the lever V.

I now proceed to a description of the mechanism for storing the power of the brake.

A cylinder, 4, closed at the end next to the end sill of the car, is fastened to one of the draw-timbers. It is slotted longitudinally top and bottom, at 5, for about half its length. Within this cylinder is a smaller cylinder, 6, capable of sliding therein, and closed at the end nearest the end sill of the car. Through the closed ends of these cylinders passes a rod, 7, having on its outer end a retaining-nut and on its inner end a head, between which and the closed end of the inner cylinder is confined a spiral spring, 8. The spring, by its stress, tends to hold the end of the inner cylinder back against the closed end of the larger one, and it is by drawing the inner cylinder in a direction to compress the spring that the power required for instantaneously applying the brake is stored. The open end of the inner cylinder is forked, and between the arms

thus formed is supported on a suitable cross-stud or axle the sheave 2, hereinbefore referred to, with its grooved periphery in line with the slots 5 in the main cylinder 4. When the chain *c* is wound up, it, by pulling on the sheave 2, around which it passes, draws out the inner cylinder and compresses the spring 8. In order to hold the spring in this compressed state, and thus store power, which may be made available for the purpose hereinbefore indicated, I make use of a pawl-and-ratchet arrangement, forming the ratchet lengthwise upon the exterior of the upper part of the inner cylinder, as seen at 9, and employing in connection therewith a pawl; but inasmuch as it is necessary that the power should be kept stored without interfering with the operation of the automatic-brake mechanism, and also that it should be in condition to be applied when needed independently of said mechanism, I employ special devices for this purpose, which I now proceed to describe.

The pawl just referred to is a double pawl, (shown at 10.) One of its ends, *x*, works through a notch, 11, in the outer cylinder, and is adapted to engage the ratchet-teeth 9. Its other end, *y*, is adapted to engage a ratchet-wheel, 12, which is fast to or forms part of the sprocket-wheel 1, mounted and adapted to revolve in the main cylinder 4. The chain *c* engages this sprocket-wheel, so that the one cannot move without the other moving also. The double pawl 10 is connected by a link, 14, to a crank-arm, 15, on rock-shaft 3, hereinbefore referred to. When the shaft 3 is in position shown in Fig. 8 the end *y* is disengaged from the ratchet-wheel 12, and the end *x* drops into engagement with ratchet 9 and holds the inner cylinder from moving in the direction of the stress of its spring. When the shaft is in the position shown in Fig. 9 the end *y* engages and holds the ratchet 12 of the sprocket-wheel, while the end *x* (by reason of the incline *s* on it working against the rise or incline *t* on the cylinder) is lifted out of engagement with ratchet 9. The arrangement is such that the pawl always engages and holds either the sprocket-wheel or the spring-containing cylinder, and never disengages from one before engaging the other.

The mode of operation is as follows: When the three-armed lever O is brought to the position requisite in order to apply the friction-brake mechanism, as shown in Fig. 3, the pawl is moved so as to engage the sprocket-wheel and to quit the spring-containing cylinder, as seen in that figure. The chain *c*, as it winds up, draws out the cylinder and compresses the spring. When after this the three-armed lever is turned back again and the brakes are released the pawl will take the position indicated in Fig. 8, engaging the cylinder and holding the spring under compression and releasing the sprocket-wheel. When after this it becomes necessary to use the power thus stored, in order to instantaneously apply the brakes, the shaft 3 is operated from the friction-brake shaft P, so as to throw the pawl to the position shown in Fig. 9, in which it engages the sprocket-wheel and is disengaged from the spring-containing cylinder. The spring, thus freed from restraint, expands and forces back its cylinder, and in so doing causes the sheave 2 to draw on that part of the chain *c* intermediate between the now rigid and immovable sprocket-wheel and point *c'*, where the chain is attached to the brake-rod E^4, with the effect of applying the brakes. Thus by means of this combination power is stored and kept constantly on hand, available for instantaneous application of the brakes to the car whenever the necessity for this shall arise.

Having now described my improvements, what I claim as new and of my invention is—

1. The combination, with the friction-brake mechanism, of storage mechanism, substantially as described, connected with and acted on by the friction-brake chain, when the latter is wound up, to store and accumulate power in the manner specified, and operated when released from the control of its detent or retaining device to pull upon the said brake-chain in the direction requisite to apply the brakes, substantially as hereinbefore set forth.

2. The combination, with the friction-brake mechanism, of the main cylinder, the spring-containing cylinder, its spring and sheave, the sprocket-wheel, and the double pawl adapted to engage at one end a ratchet on the sprocket and at the other a ratchet on the spring-containing cylinder, and connected with and adapted to be operated by both the three-armed lever of the friction-brake mechanism and a brake-shaft on the car, substantially as and for the purposes hereinbefore set forth.

3. The vertical three-armed lever, in combination with the two draft-rods W S, the friction-brake shaft G^2, and the connecting-rod N^3, substantially as and for the purposes hereinbefore set forth.

4. The two compensating-levers V V', the friction-brake chain and the brake-rod E^4, combined with the draft-rods W and S, the friction-brake mechanism, and the friction hand-brake shaft, substantially as and for the purposes hereinbefore set forth.

5. The combination, with shaft 3, of the three-armed lever and its connections, the double pawl or retaining device, and power storage mechanism connected with the same, and the brake-shaft P, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 28th day of June, 1882.

BENJAMIN L. STOWE.

Witnesses:
FREDERICK A. STOWE,
NATHAN STOWE.