

A. G. SAFFORD.

2 Sheets—Sheet 1.

Car Brake.

No. 37,246.

Patented Dec. 23, 1862.

Fig. 1.

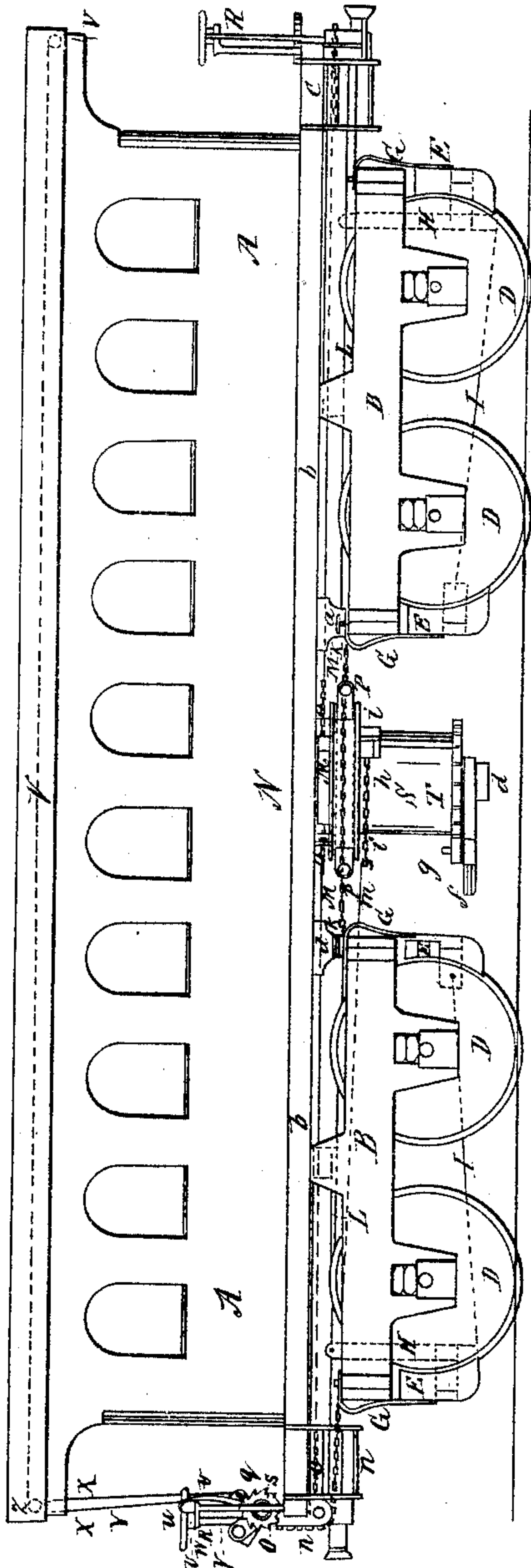
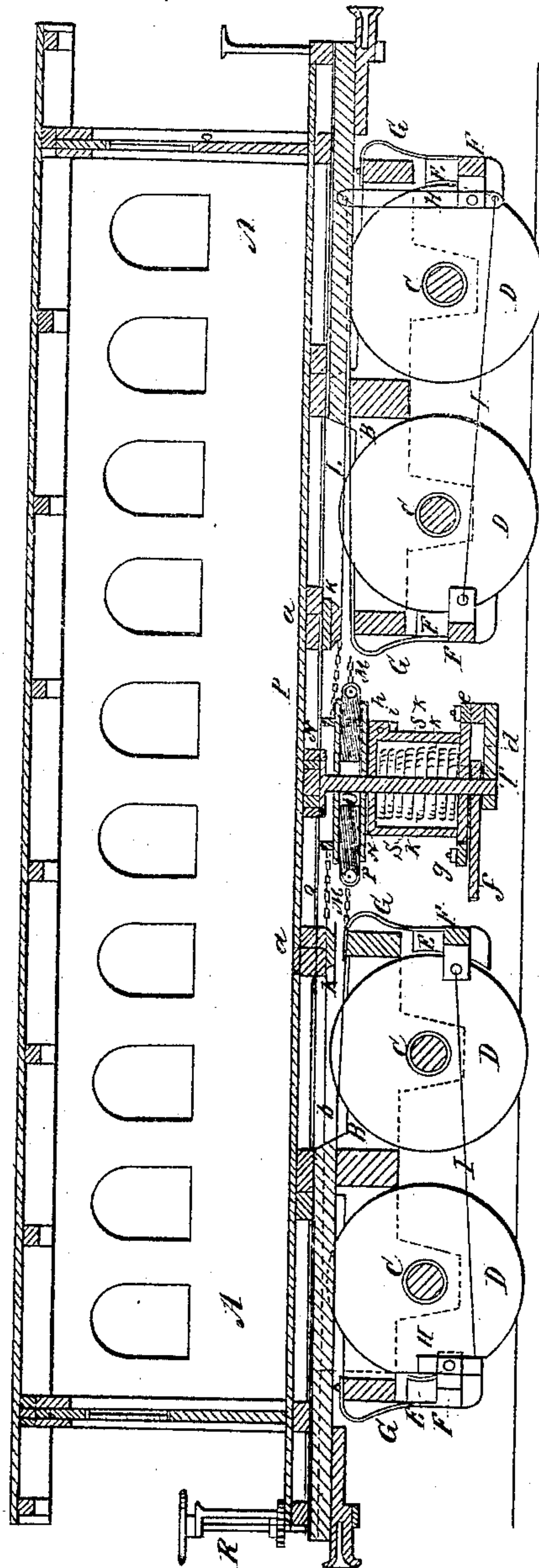


Fig. 2.



Witnesses:

J. R. Halye  
J. R. Bampton

Inventor:

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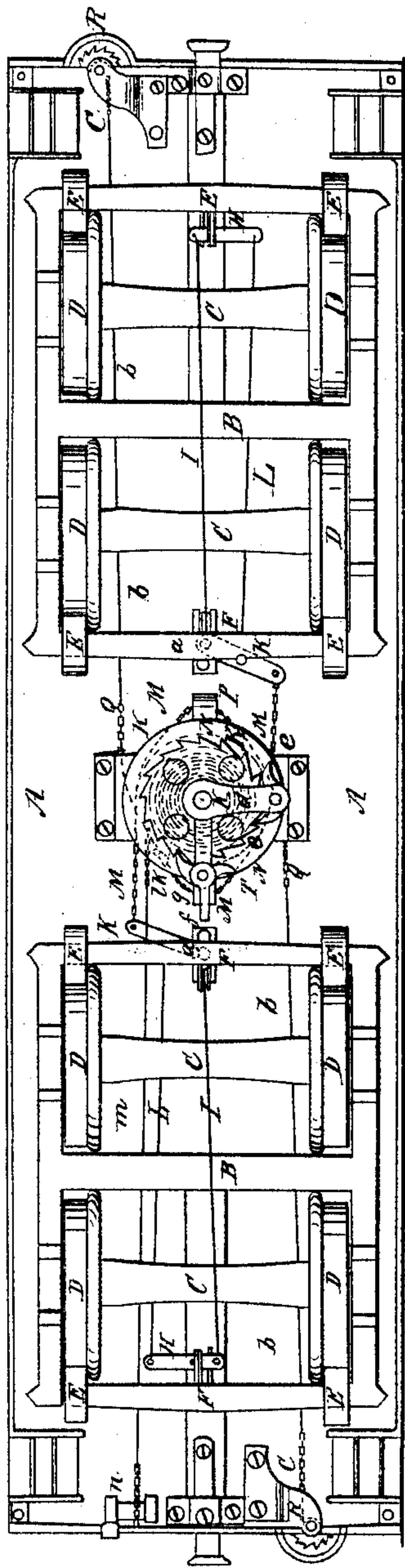
2 Sheets—Sheet 2.

Car Brake.

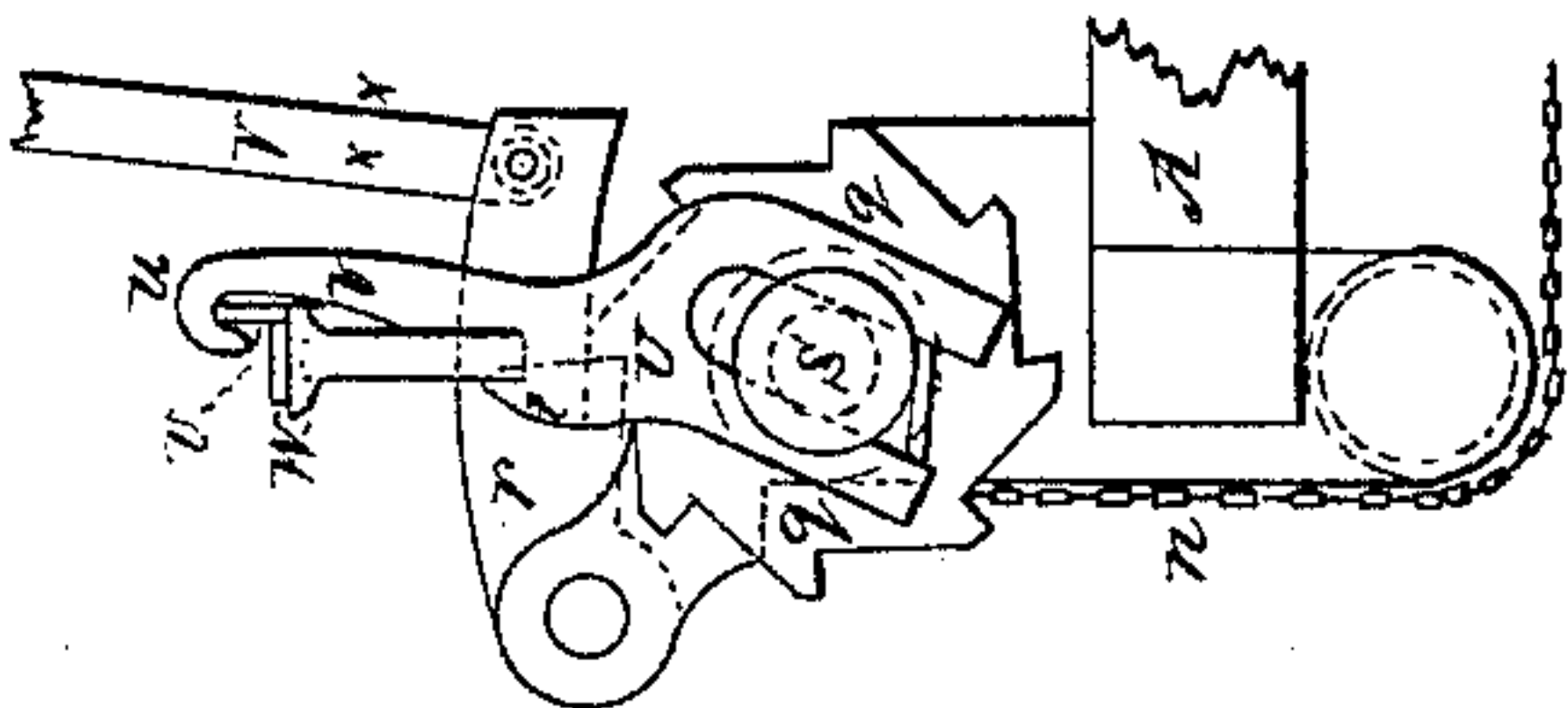
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Fig. 2.



Side view of part of referring mechanism.



Sectional view.

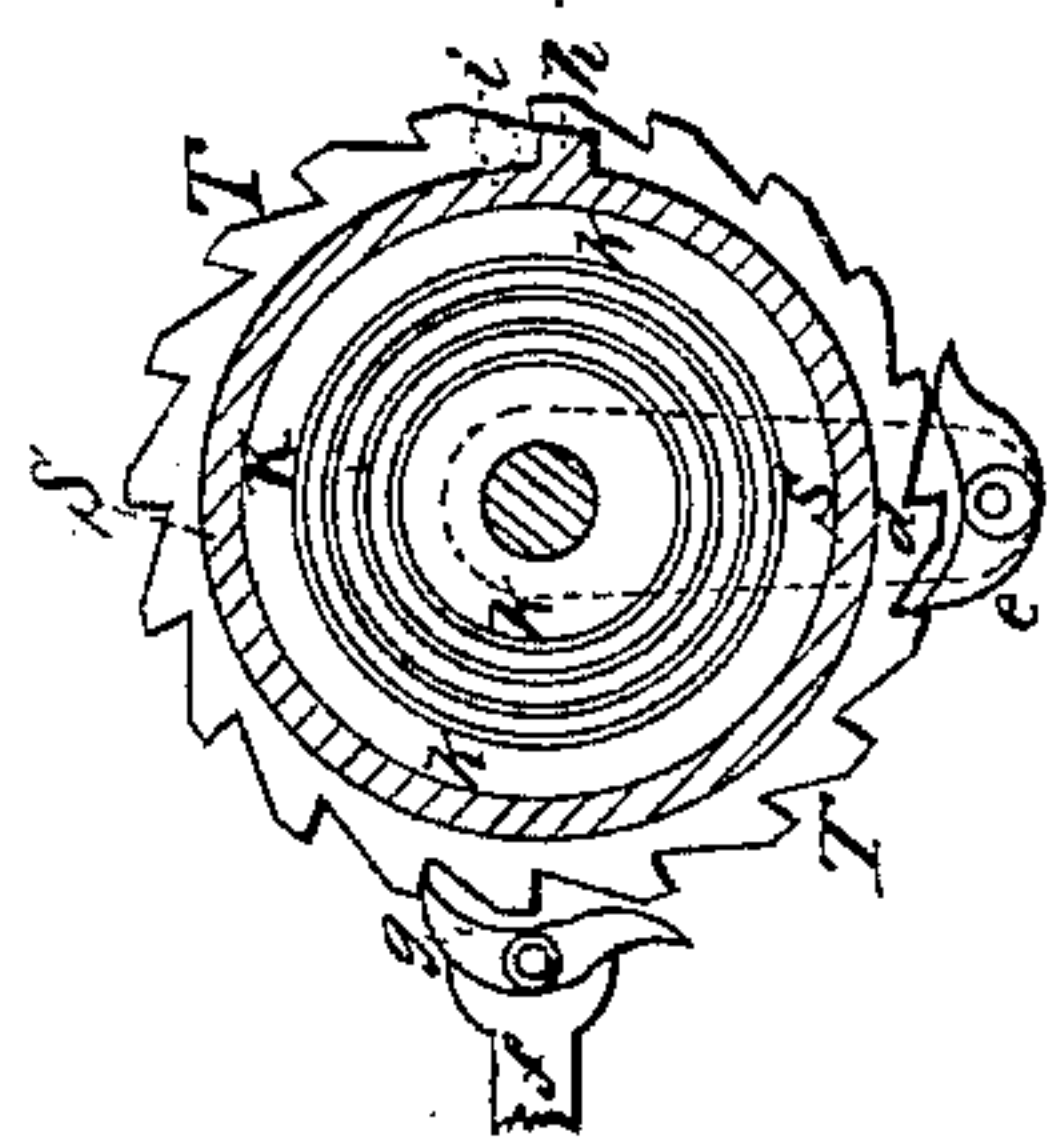
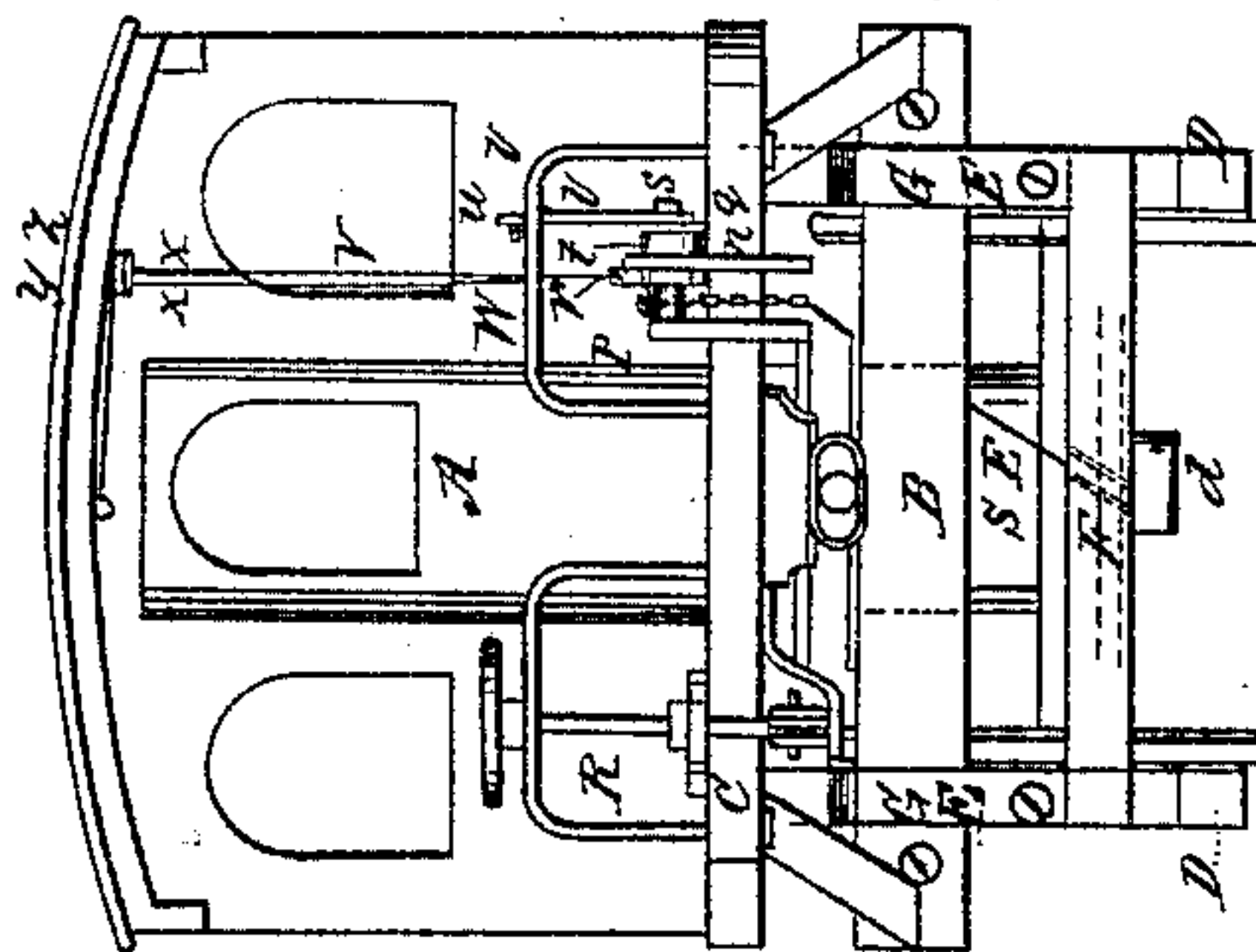
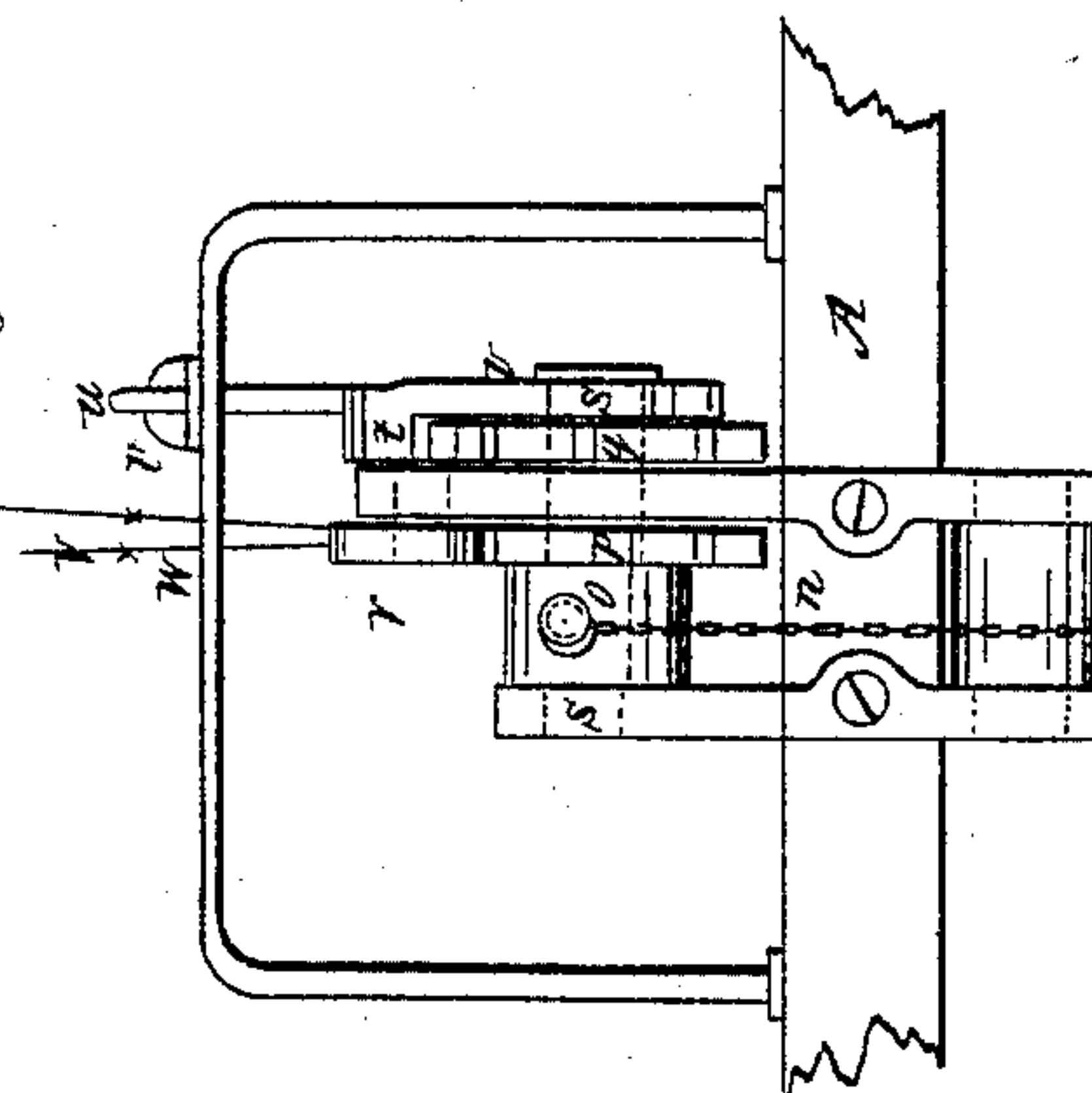


Fig. 3.



Front view of part of referring mechanism.



Witnesses:

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J. R. Sampson.

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# UNITED STATES PATENT OFFICE.

ALBERT G. SAFFORD, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MODE OF OPERATING BRAKES OF RAILROAD-CARS.

Specification forming part of Letters Patent No. 37,246, dated December 23, 1862.

*To all whom it may concern:*

Be it known that I, ALBERT G. SAFFORD, a citizen of the United States of America, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have made an invention of certain new and useful Improvements in Mechanism for Operating the Brakes of Railway-Carriages; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 denotes a side elevation, Fig. 2 an under side view, Fig. 3 an end elevation, and Fig. 4 a vertical and longitudinal section, of a railway-carriage provided with my invention.

By means of the said invention the brakes may be put in operation either by manual power or by the expansive force of one or more springs, this latter method of actuating them affording a powerful means of suddenly arresting the velocity of a railway-carriage while it may be in rapid motion.

The nature of my invention consists in the combination of an "equalizer" with the pulley and chains of the hand-windlasses and system of brake-levers; also, in an arrangement of a spring-drum and its coupling and winding mechanisms with the said pulley, as arranged between the two trucks of the carriage, in manner as hereinafter specified; also, in the combination and arrangement of two or more separate springs with the spring-drum and its rotary head, to be hereinafter described; also, in the arrangement and combination of certain "relieving" mechanism with the rotary spring-drum and the chain-pulley arranged together substantially as specified; also, in an arrangement of a tripping-line with the carriage and the relieving mechanism at one end thereof; also, in the combination and arrangement of the auxiliary levers with the central pulley and the system of levers and rods connecting the brakes of the trucks, as described.

In the drawings, A exhibits the carriage-body as supported by two trucks or separate carriages, B B, each of which has two axles, C C, and four wheels, D D D D, the whole being constructed and applied together and furnished with brakes in the usual manner. The brakes to each pair of wheels is shown at E E as connected by a bar, F, each pair of brakes being suspended from the truck-frame by two springs, G G, formed and arranged as

shown in Figs. 1 and 3. To the cross-bar F of the outer set of wheels of each truck a lever, H, is jointed at its fulcrum, and is connected with the fellow bar F of the same truck by a connecting-rod, I, the same being as shown in Figs. 2 and 4. The longer or upper arm of the said lever is also connected with a secondary lever, K, between its fulcrum and outer extremity, by another connecting-rod, L. Each of the levers K has its fulcrum *a* projecting from the flooring of the carriage-body A, and has a chain, M, proceeding from its extremity to and around the periphery of a pulley, N, which is arranged horizontally under the middle part of the carriage-body, and so as to be capable of turning freely on a spindle, O, projecting downward from the said body A. A bar, P, (which I term the "equalizer,") slides diametrically within the pulley N and projects at each end beyond it, the chains M M being carried through the said bar near its extremities and afterward being fastened to the periphery of the pulley N. Two other chains, Q Q, are also fastened to the periphery of the pulley N, and after being wound in opposite directions around the same are attached to two rods, *b b*, which, by means of the chains *c c*, are respectively connected with upright hand-windlasses R R, arranged at the opposite ends of the carriage, as shown in the drawings. By turning either of these windlasses so as to wind its chain *c* thereon, the pulley N will be put in rotation in such a direction as to cause the chains M M to be wound upon it and draw on the auxiliary levers K, in which case the brakes will be forced against the wheels. Now if, by reason of the inequality of wear of the brakes or other cause, they (the said brakes of the two trucks) would be likely to act unequally on their wheels, the bar P would be caused to slide more or less longitudinally within the pulley N, so as to vary the leverage on the two chains M M in a manner to correct the inequality of action of the brakes of the two trucks. Underneath the pulley N, and separate from it, is a hollow drum, S, which revolves freely on the spindle O, and over a ratchet, T, which constitutes a head or cap to the lower end of the said drum, and also revolves freely on the spindle O. An arm, *d*, projects from the lower end of the spindle, and carries a retaining lever-pawl, *e*, which engages with the teeth of the ratchet.



Furthermore, between the said arm and the ratchet there is a lever, *f*, which has the spindle *O* for its fulcrum, and carries an impelling-pawl, *g*, to operate with the said ratchet *T*, the whole being as shown in Figs. 1, 2, and 4. A stud or tooth, *h*, projects from the outer surface of the drum *S*, and near to its upper end, there being also a similar stud or tooth, *i*, extended downward from the pulley *N*. The drum *S* contains four helical springs, *k k k k*, which are arranged one within the other and concentrically around the spindle *O*. The upper end of each of these springs is fastened to the drum *S*, the lower end of said spring being connected to the ratchet *T*. By laying hold of the lever *f* and moving it in one direction so as to force the pawl *g* against the ratchet, the several springs *k* may be wound up. Two or more helical independent springs, arranged as described, are employed in order that should either become broken the other would remain intact and in operation. By such an arrangement of springs the brake mechanism is rendered certain of action, which it would not be were one spring only used, as such spring from various causes might break or become broken at a time when such an accident might be productive of serious consequences. One end of a chain, *l*, is attached to the outer surface of the drum *S*, and has its other end connected with one extremity of a rod, *m*, whose opposite end is applied to a chain, *n*, proceeding from a short windlass, *o*, which constitutes a part of what may be termed the "relieving mechanism." This windlass is arranged at or near one end of the carriage, and has two ratchets, *p q*, affixed upon its shaft. To one of the said ratchets a retaining lever-pawl, *r*, is applied. An impelling lever-pawl, *U*, slides freely on the shaft *s* of the windlass, and in a direction transversely thereof, and is provided with a hook or projection, *t*, which extends laterally from the lever, and across the periphery of the ratchet *q*. The upper end of the lever-pawl *U* is furnished with a hook, *u*, which, when placed on a projection, *v*, from a rail, *w*, serves to maintain the projection *t* so elevated above the teeth of the ratchet as to enable the said ratchet to be capable of freely revolving with the windlass. By depressing the lever-pawl *U* and giving to it reciprocating movements up and down, we are able to rotate the windlass so as to wind the chain *n* thereon, in which case we shall produce a partial rotation of the drum *S* and relieve the wheels from the pressure of the brakes, such pressure being produced by the action of the springs within the drum. A line or cord, *V*, passes around a pulley or sheave within the retaining-pawl *r*, from whence such line is carried upward and has its two branches *x x'* passed over two other stationary pulleys, *y z*. One of the said branches is carried over a pulley in one direction, while the other is run in an opposite direction over the other pulley. One of the branches passes entirely through the carriage

longitudinally, it being intended that each carriage of a train should be provided with such a line, and that all the lines should be so connected together that a pull on either of them shall simultaneously raise all the retaining-pawls *r* of the several carriages. The result of raising each impelling-pawl *r* out of engagement with its ratchet *p* will be that the springs within the drum *S* will be free to rotate the said drum in a manner to force its tooth *h* against the tooth *i* of the pulley *N*, in which case the pulley will be clutched and revolved with the drum, and by winding the chains *M M* will cause the brakes to be forced powerfully against their respective wheels. In order to relieve the wheels from such pressure the lever-pawl *U* is to be moved so as to operate the windlass *o*, and wind the chain thereof upon the said windlass. The lever *f*, the impelling-pawl *g*, the ratchet *T*, and retaining-pawl *e* afford a means of increasing the expansive power of the springs, or, in other words, of rotating the said springs so as to increase their pressure on the drum *S*.

From the above it will be seen that by working either of the hand-windlasses *R R* we have the means of forcing the brakes against their wheels by manual power; also, that we have in the springs of the drum *S* an automatic means of power of actuating the brakes, one which may be brought into operation suddenly and with great certainty of action and useful results.

I am perfectly aware that it is not new to operate a brake apparatus by the expansive power of a spring, and therefore I lay no claim thereto; but

What I do claim as my invention is as follows:

1. The combination of the equalizer *P* with the pulley *N*, and the chains of the windlasses *R R*, and the system of brake-levers.
2. The arrangement of the spring-drum *S*, and its coupling and winding mechanisms—viz., the teeth *h i* and the system of one or more springs, *k k*, with the pulley *N*, arranged between the two trucks, and so as to operate substantially in manner as specified.
3. The combination and arrangement of two or more separate springs, *k k*, with the spring-drum *S* and its rotary head or ratchet *T*.
4. The arrangement and combination of a relieving mechanism—viz., the windlass *o*, with its ratchets *p q*, and retaining and impelling pawls *r U*, and connections *l m n*, with the rotary spring-drum *S*, and the chain-pulley *N*, arranged substantially as hereinbefore specified.
5. The arrangement of the tripping-lever *V* with the car-body and the relieving mechanism, substantially as specified.
6. The combination and arrangement of the auxiliary brake-levers *K K* with the pulley *N*, and the system of levers and rods connecting the brakes of trucks, as described.

Witnesses:

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F. P. HALE, Jr.