(No Model.) 3 Sheets—Sheet 1.

B. L. STOWE.

Automatic Car Brake.

No. 231,115. Patented Aug. 10, 1880.

Fig. 1.

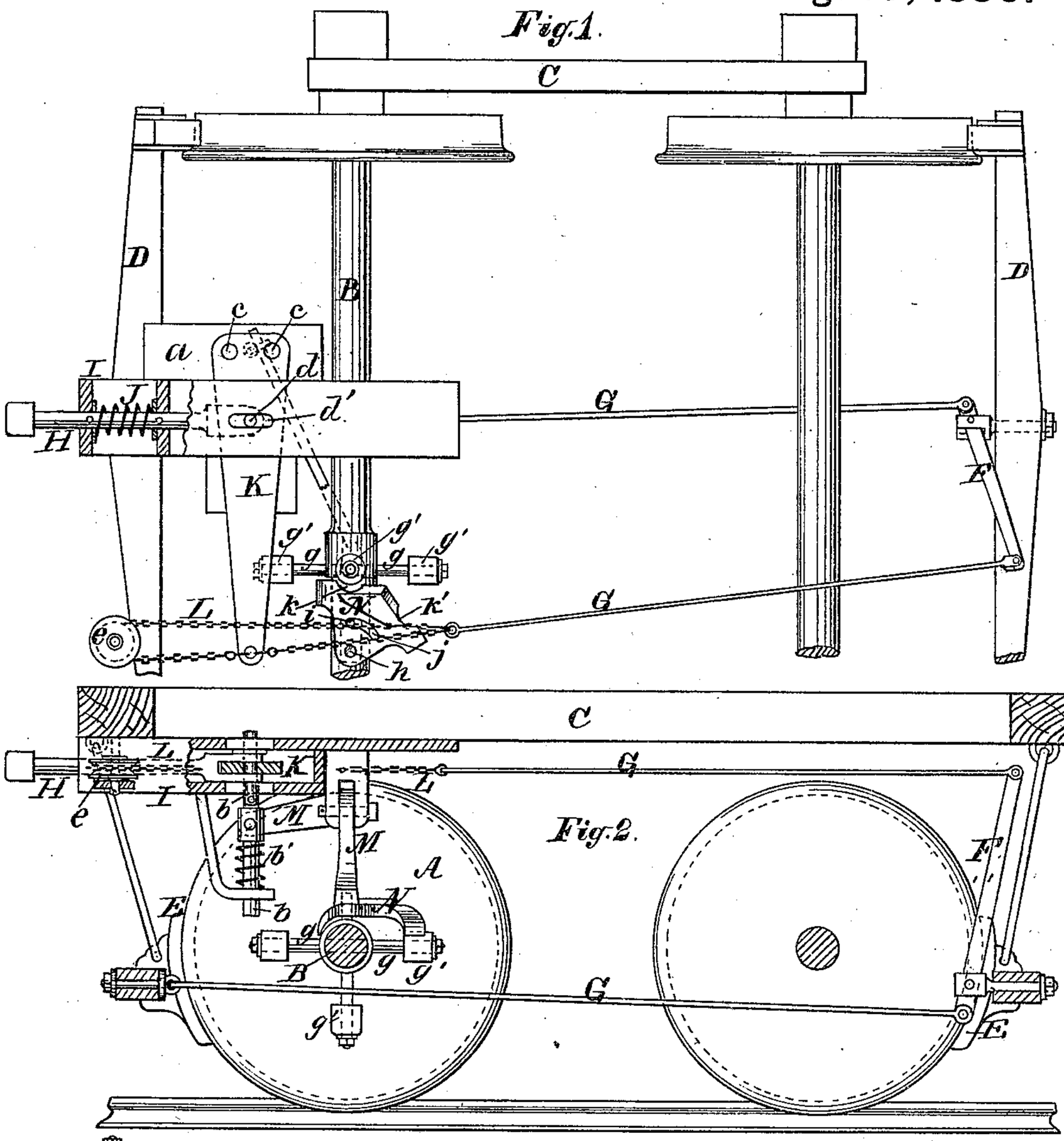

Fig. 2.

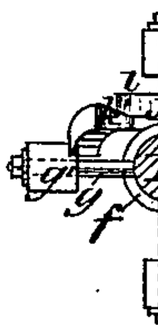

Fig. 14.

Fig. 3.

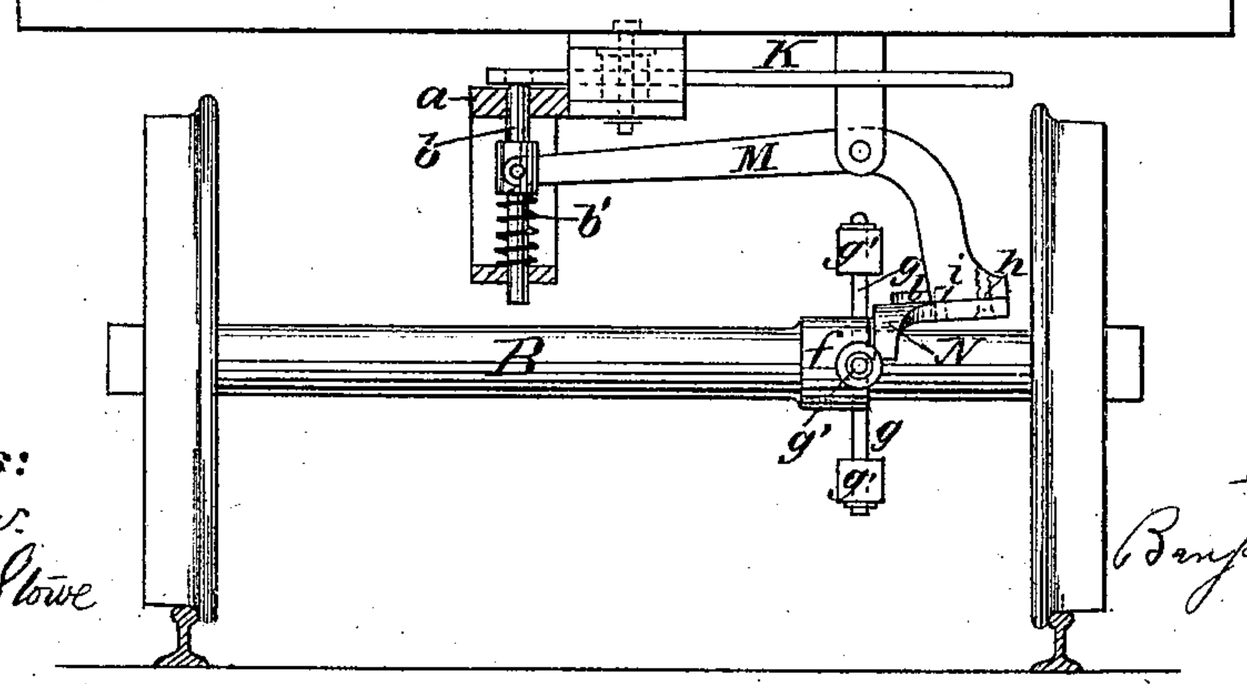

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Fig. 4.

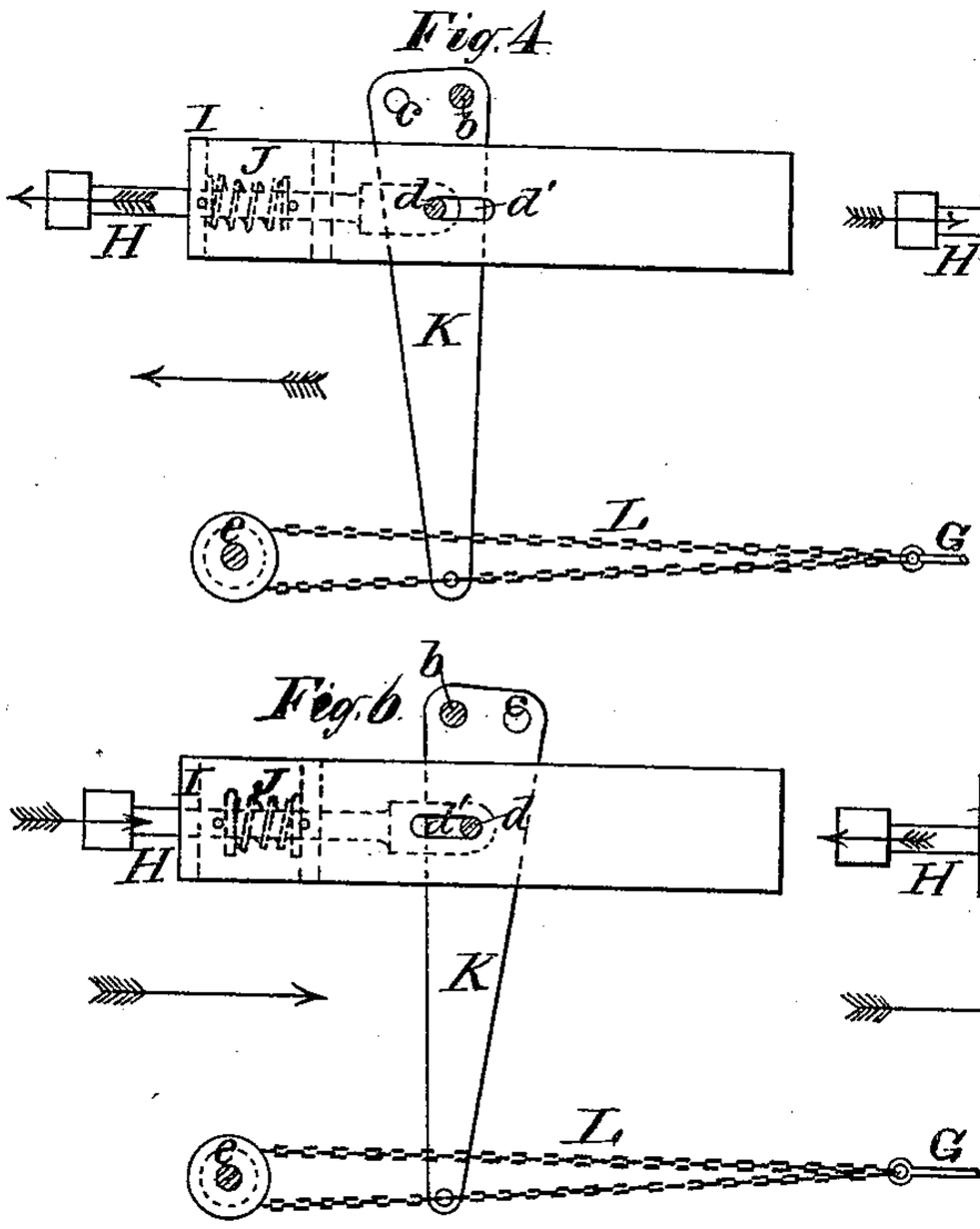

Fig. 5.

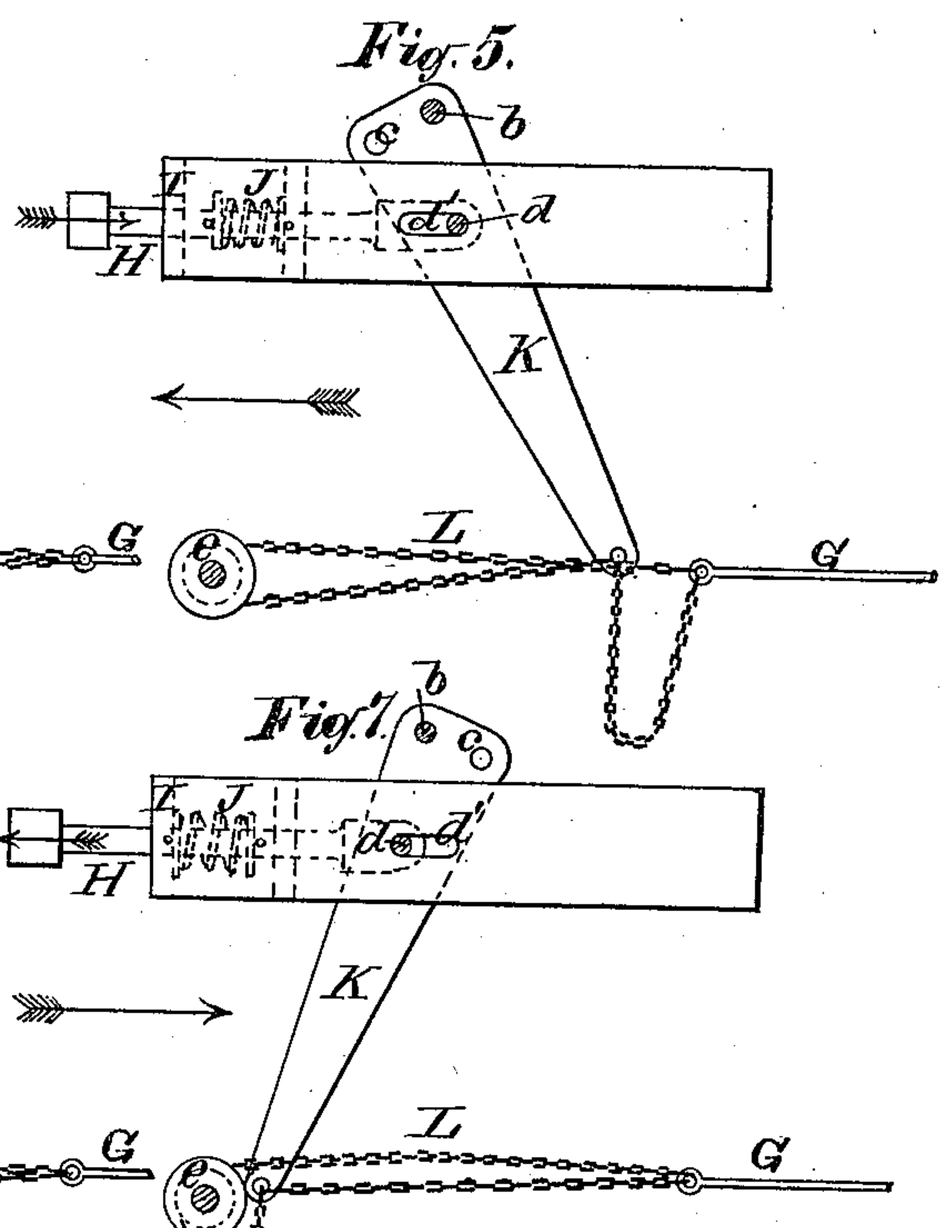

Fig. 6.

Fig. 7.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 8.

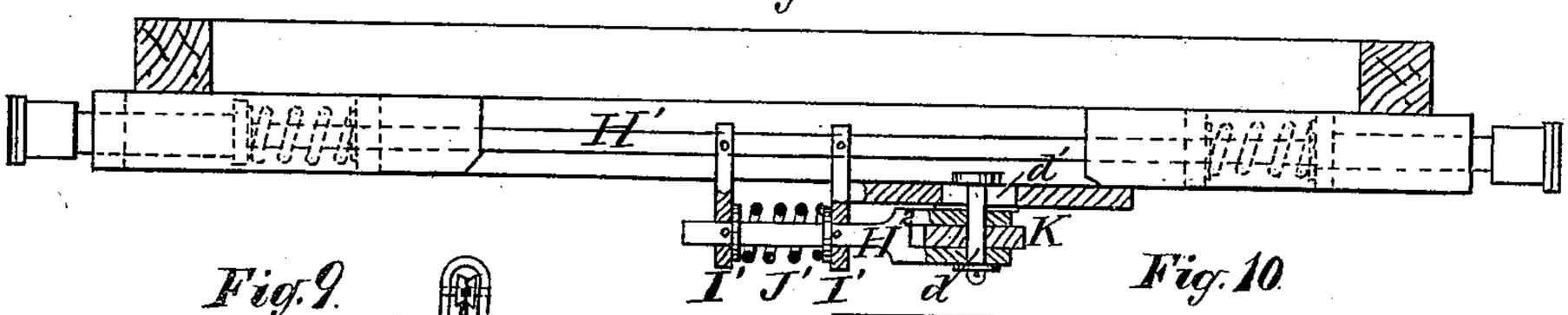


Fig. 9.

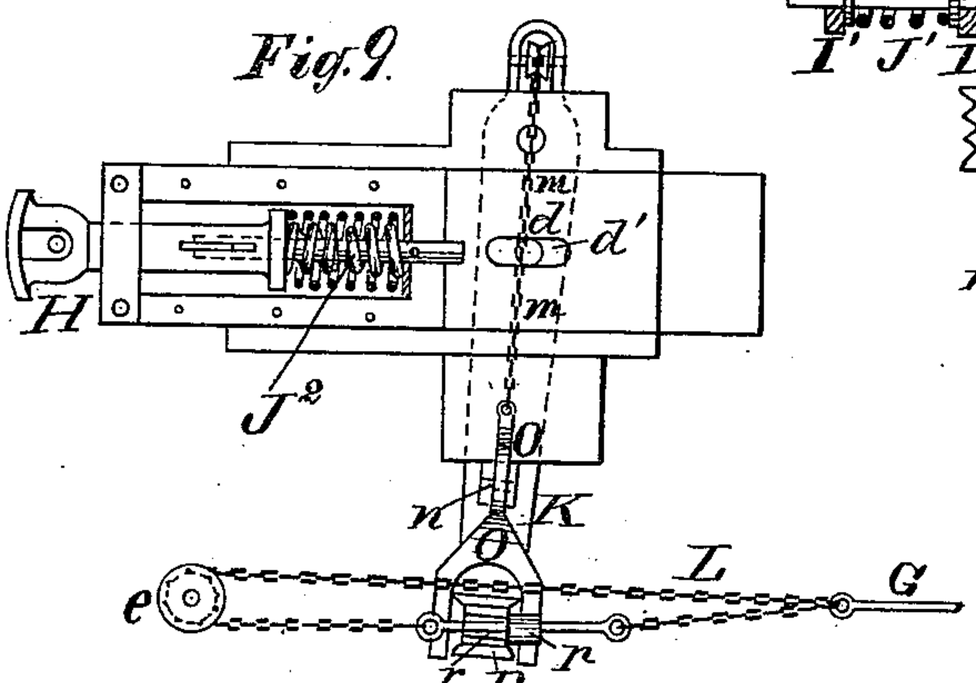


Fig. 10.

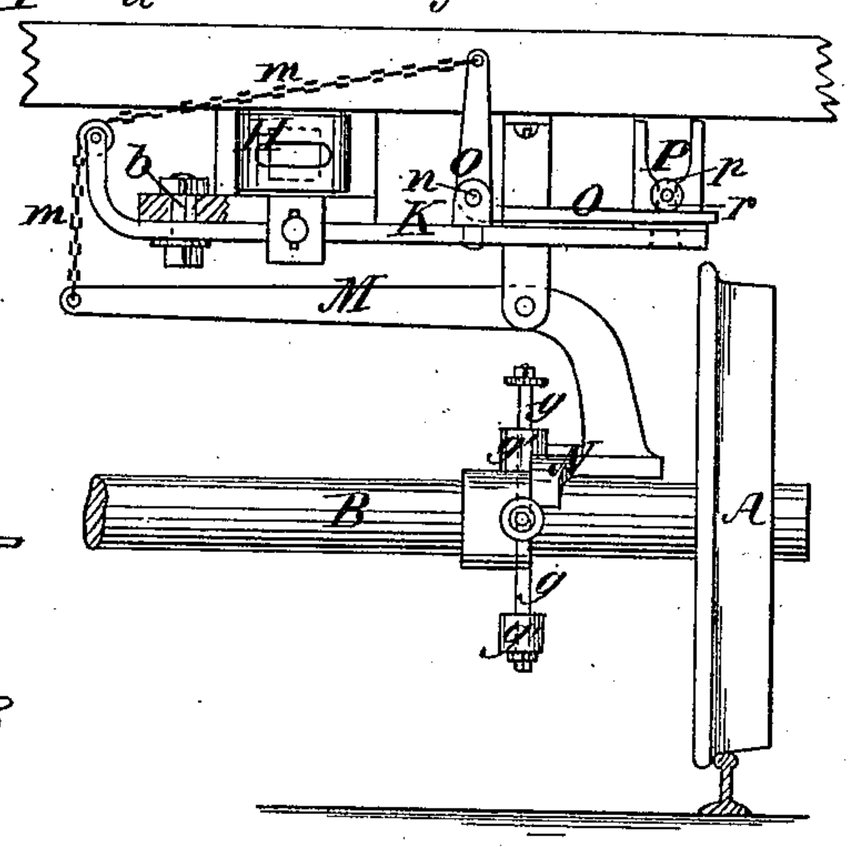


Fig. 11.

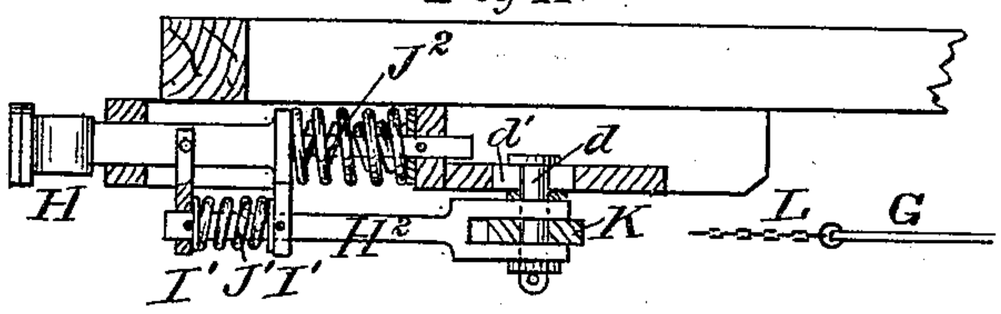


Fig. 12.

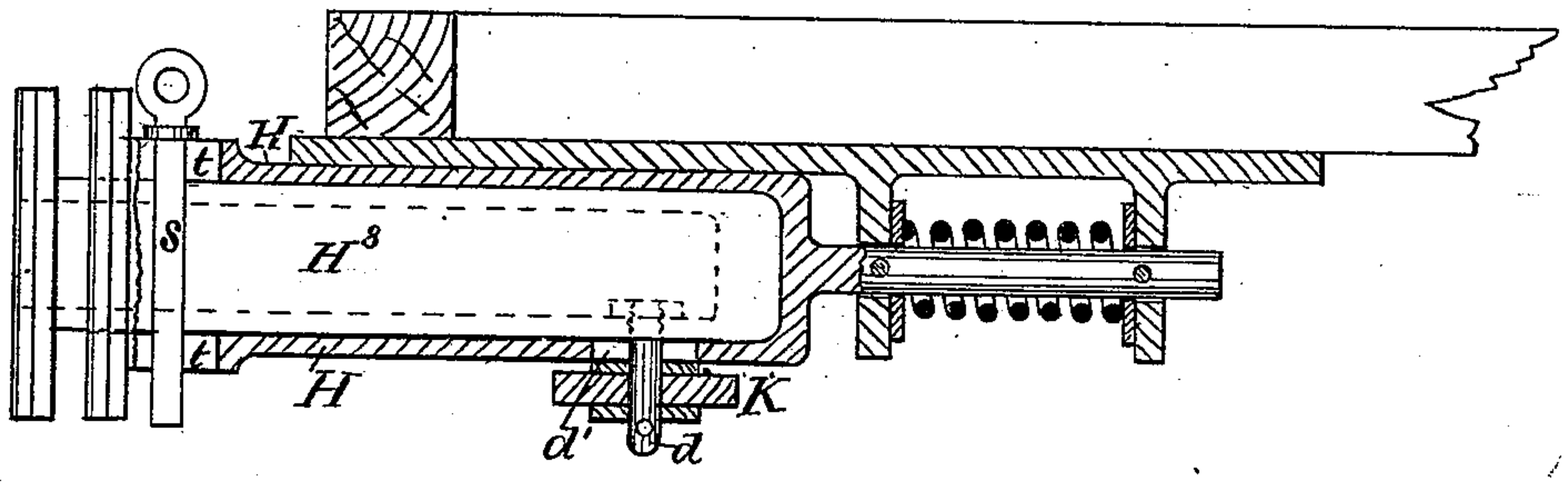
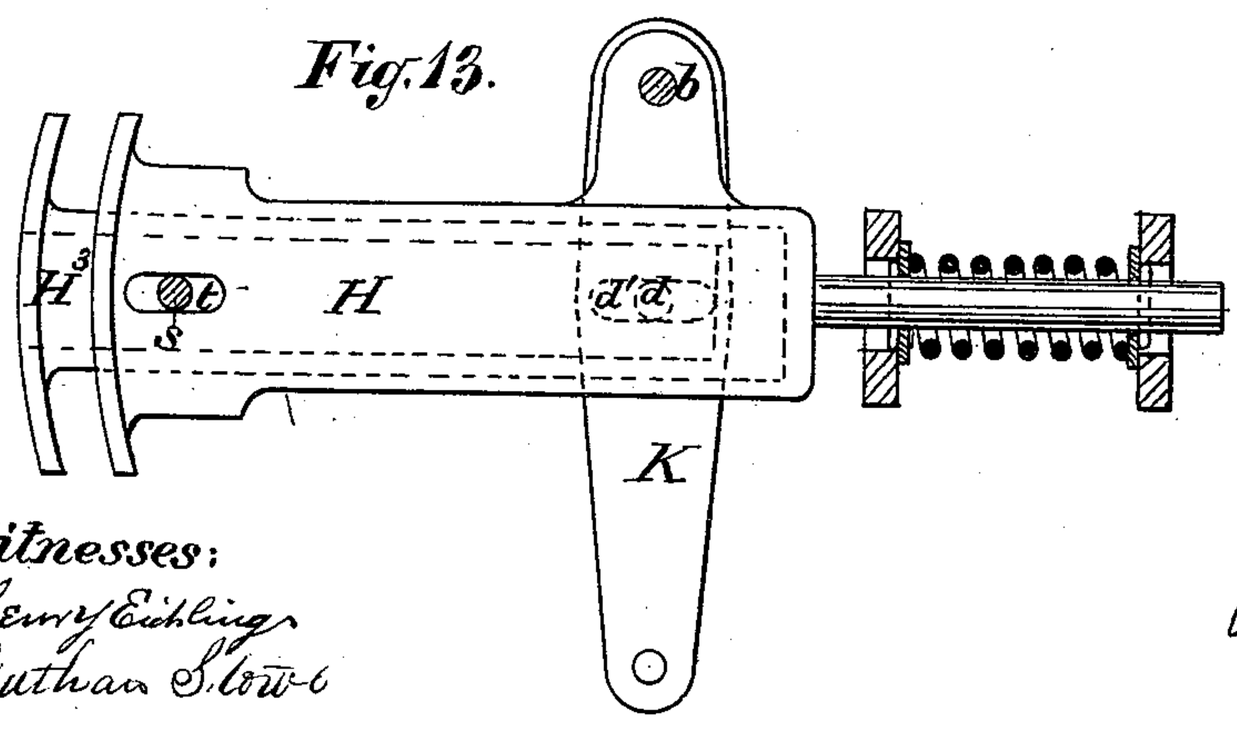


Fig. 13.



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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. 231,115, dated August 10, 1880.

Application filed June 9, 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 a certain new and useful Method of and Means for Automatically Controlling the Brakes of Railway-Cars, of which the following is a specification.

My invention consists in a mode of controlling brakes of a railway-car, in whichever direction the car moves, by mechanism which causes the brakes to be applied at required times by means of the pushing or drawing, under certain circumstances, of the draw-bar, in conjunction with other mechanism which causes all connection between the draw-bar and brake-levers to be dissolved and the brake-applying mechanism to become inoperative when the car is moving very slowly, in order to offer the mechanism opportunity to properly adjust itself to circumstances under which it may be placed when the car again attains a higher speed.

In an application for Letters Patent filed in the United States Patent Office on or about April 15, 1880, I have shown one form of mechanism adapted for this purpose, comprising, among other instrumentalities, a compound lever and movable fulcrum-pin.

In my present application I have shown and described, in illustration of my invention, some of the other many possible practical modifications of the system, for some of which it is my intention to make application for Letters Patent; but the method of operating remains the same through them all, and it is for the protection of mechanism involving that mode of operation that Letters Patent are here sought.

It is also my intention to make a separate application for Letters Patent for the mode of controlling brakes by means of the continuous draw-bar, hereinafter described, in combination with friction devices of various kinds.

In the drawings, Figure 1 is a sectional plan, Fig. 2 a sectional side elevation, and Fig. 3 a sectional rear-end elevation, of so much of a car truck or frame as needed to illustrate my invention. Figs. 4, 5, 6, 7 are plans of the brake-lever-operating mechanism in various positions.

In the drawings, A are the wheels; B, the axle; C, a portion of the truck-frame; D, the brake-beam; E, the brake-shoes; F, the brake-lever, and G rods, all of which are similar to those now generally in use.

H is the draw-bar; I J, the draw-bar guide and spring, all of which are similar in principle to those already in use, although, as shown, they are somewhat modified in form. Bolted to the draw-bar guide I is a plate, *a*, through a hole in which passes a vertical pin, *b*, the latter being forced upward by a spring, *b'*, about it lower end. This pin serves as a fulcrum for the lever K whenever it passes up into one or the other of the holes *c* in the broader end of the lever. Power is applied to the lever by means of the pivoting-pin *d*, which connects it with the end of the draw-bar H, and extends up through a longitudinal slot, *d'*, in the top of the draw-bar guide.

The longer end of the lever has secured to it a chain, L, which runs from one side direct to the brake-rod G, and from the other around a sheave, *e*, and then back, and also fastened to the brake-rod, so that any movement of the lever in either direction causes the brake to be applied.

Upon the axle B of the car is a collar, *f*, from which radiate four arms, *g*, and each one of these arms has about it a cylindrical weight, *g'*, which is free to slide or move by its own gravity on the arm between the collar and the nut on end of arm as the axle revolves, if said axle be not revolving at so high a speed as to cause the centrifugal force to overcome the force of gravitation.

A lever, M, pivoted to a support secured to the frame of the truck, has the end of one arm pinned to the vertical pin *b*, so that any downward movement of this end of the lever draws the pin down, while, upon the other hand, the spring *b'* forces this end of the lever upward when the other end of the lever is disengaged. Pinned at *h* to the other arm of the lever is a peculiar-shaped piece, N, which is free to turn upon the stud or pin *h* as far as the pin *i* in the slot *j* will allow it to go, that being from the position in which it is shown in Figs. 1 and 2 to one in which the semicircular recess *k'* in the side of piece N will occupy—the position now occupied by the corresponding recess

k. This shifting is done by the weights *g'* pushing against the piece N when they move in the direction in which it is to be shifted.

The curved wings of the piece N are a little longer than the center of the piece, (see Fig. 1,) and also a little higher, (see detail, Fig. 14,) except that there is a small piece, *l*, at the center, which is placed back a little way from the front, and is only employed to assist in the changing of position.

When the axle revolves slowly each weight, as it passes under the axle, drops to the outer end of the arm, in which position it remains until it is carried high enough to cause it to slide in upon the arm, when it will bring up against and rest upon one of the wings of the piece N, and will slide along against that until it comes to the semicircular recess *k*. If the axle be revolving very slowly the weight will drop into the recess. If, however, the axle shall have any considerable speed the weight will not drop into the recess, but, in consequence of the wing being thicker or higher than the center, it will be carried beyond the recess and fall upon the center *l* of the piece, upon which it will slide until it falls off the point of N and passes around under the axle again.

When a ball or weight does fall into the recess *k*, and is then carried forward against the center of the piece N, it will, as it rolls out of the recess, push the piece N back, which movement causes the lever M to draw down the fulcrum-pin *b*, and thus release the lever K.

In consequence of the wing being longer than the center of piece N, the weights will still continue to slide upon the wing, even though the one rolling against the center shall have pushed the pieces back. The object of this arrangement is to draw the pin when the train is running very slowly, and thereby destroy the working connection between the draw-bar and the brake-rods, in order that the mechanism may have opportunity to adjust itself to work properly under the circumstances to which it may be subjected when the train again attains a high speed—as, for instance, if the car has just begun moving ahead, being drawn by the engine, and the pin *b* being depressed, the draw-bar will be drawn out by the strain upon it, thus drawing forward lever K until the rear hole, *c*, comes over the fulcrum-pin *b*, which will at once rise up into this hole as soon as the axle revolves fast enough to prevent the cylindrical weights from falling into the recess in the shifter-piece N, the pin remaining in the hole *c*, and there forming a fulcrum for the lever, as indicated in Fig. 4, until the train has again almost stopped.

In the meantime, while any drawing out of the draw-bar or its being forced back to a central position by the spring J will not materially affect the brake-chain L, a pushing back of the draw-bar will cause the lever K to draw upon that part of the chain passing around the sheave, and will thereby apply the brake, as in Fig. 5.

When the car is being backed by the engine the action will be similar, except that the motions will be reversed, inasmuch as the draw-bar will be crowded back when the car begins to move, and the fulcrum-pin will rise in the foremost hole, *c*, in the lever K, as shown in Fig. 6. When, under these conditions, the brake is applied to the engine so as to check its speed, the draw-bar will be drawn out and the end of the lever K will pull directly upon the brake-rod, as seen in Fig. 7. When the steam is shut off from the engine and the train allowed to run of its own momentum the brakes will not be applied.

More or less than four of the cylindrical weights *g'* may be employed.

In Fig. 8 is shown a continuous draw-bar, H'. In this arrangement the lever K is not pinned directly to the draw-bar, but to a supplemental bar, H^2, by means of pin *d* passing up through a slot, *d'*, in the frame.

The bar H^2 passes freely through and has bearings in the hangers I', attached to the draw-bar, and carrying between them a spring, J', encircling the bar H^2, and held between two washers on the latter, as shown.

The lever K can be connected with the brakes and arranged to operate in the same manner as previously described, or it may be combined with mechanism such as shown in Figs. 9, 10, and 11. The arrangement shown in those figures will now be described, Fig. 9 being a sectional plan, Fig. 10 a sectional end elevation, and Fig. 11 a sectional side elevation, of so much of the brake mechanism as needed to illustrate the invention.

The draw-bar H is of the usual construction, and with it I prefer to use, in lieu of the ordinary buffer-spring, a spring (shown at J^2) called the "Vose equalizer" spring, which consists of one spiral spring surrounding two smaller ones, the same being so formed and arranged with respect to one another that the outer spring will be somewhat compressed before the inner ones receive pressure.

I prefer to have the outer spring comparatively light, in order that the draw-bar may move a certain distance in either direction before the heavier and shorter inner springs begin to be compressed. The same result can be obtained by using heavy and light springs in various other ways.

The lever K in this arrangement is connected to the draw-bar in the manner illustrated in Fig. 8—that is to say, by means of the supplemental bar H^2, pinned at *d* to the lever, the hangers I', and spring J.

In lieu of employing a movable fulcrum-pin, as hereinbefore described, I here use a permanent fulcrum-pin, *b*, which is never withdrawn, and I make use of a different arrangement for dissolving and restoring working connection at proper times between the draw-bar or lever and the brakes.

The shifting-lever M, operated from the axle of the car by the arms and weights *g g'* and the shifter-piece N, as hereinbefore described,

is connected in this instance, not to the fulcrum-pin, but to a chain, *m*, which passes up over a guide-pulley on the lever K, and is attached to the upright arm of an elbow-lever, O, pivoted at *n* to a bearing on lever K, and having the end of its horizontal arm divided, as shown in Fig. 9, to straddle a fork, P, swiveled on a vertical axis on the upper face of lever K. The brake-chain L is not fastened to the lever, but passes from the brake-rod G to and around the pulley or sheave *e* on the car-frame, and thence back to the brake-rod. One part of the chain passes between the arms of the fork P, and is provided at that point with a collar or enlargement, *p*. The arms of the fork P are far enough apart to permit the collar *p* to pass between them without obstruction, but below this wide part of the fork there is a slot, *r*, through which the chain passes, and which is sufficiently narrow to prevent the passage through it of the collar. In this event, when the lever K is moved in the proper direction, the fork P, bearing against the collar *p*, will draw the brake-chain, and so apply the brakes, the collar and fork thus taking the place of the movable fulcrum-pin.

Whenever the train is moving very slowly, the lever M, operated by the parts *g g'* and N, as hereinbefore described, will, through the intermediary of chain *m*, draw back the vertical arm of elbow-lever O. The horizontal arm of said lever, which straddles the fork P and extends under the brake-chain, will thus be caused to rise, and in so doing will lift the brake-chain out of the slot *r* into the wider part of the fork, which will permit the collar *p* to pass in one direction or the other without hinderance. Working connection between the brakes and lever K will thus be dissolved, and the lever will be free to move without operating the brakes. When the car again starts, whether going forward or backward, the lever K will be moved so as to bring the fork P to one side or the other, as the case may be, of the collar *p*, the brake-chain still being upheld by the elbow-lever O. As soon, however, as high speed is attained the lever M, no longer acted on by the centrifugal weights, will permit the elbow-lever to drop, thus letting the brake-chain down into the slot *r*, and causing the collar *p* to bring up on the proper side of the fork.

In Figs. 12 and 13 is illustrated a modified construction of the draw-bar, designed to obtain a certain movement of the lever K before the main or regular draw-bar is forced in either direction.

Within the usual draw-bar H is another and somewhat similar one, H^3, with its head extending out beyond the head of the main draw-bar. The hole for the ordinary coupling-pin *s* is elongated in the regular draw-bar H, as shown at *t*, but is of the usual size in the auxiliary bar H^3, in order that when the car is being moved the inner bar may be free to move a certain distance before the coupling-pin *s* comes in contact with end of slot *t* in the main draw-bar. The latter has secured to it upon its under side a plate, to which is pivoted or fulcrumed at *b* one end of the lever K, the other end of said lever having the usual chain-connection with the brakes. Power is applied to the lever from the inner draw-bar by means of the draft-pin *d*, which passes from the inner draw-bar into the lever through the slot *d'*, in the main draw-bar.

The lever K is combined with mechanism for dissolving and restoring its working connections with the brakes in any of the ways hereinbefore set forth.

I have described some of the many practicable ways of giving effect to my invention, in order that the nature and scope of said invention may be more clearly comprehended. It will be understood, however, that I do not restrict myself to the details of construction and arrangement hereinbefore shown and specified; but

What I claim, and desire to secure by Letters Patent, is—

The combination, substantially as hereinbefore set forth, with the brake-shoes and the longitudinally-movable draw-bar, of mechanism on the one hand connected with and deriving movement from the draw-bar, and on the other hand connected with and arranged to operate the brake-shoes when the car is running in either direction, whether being pushed or drawn, and mechanism arranged and operating, when the car moves slowly, to dissolve working connection between the draw-bar and the brake-shoes, and when the car moves at a higher rate of speed to permit working connection between said parts to be automatically re-established, said connection being automatically varied to accord with the direction of movement of the car, so that in whichever direction the car moves, whether being pushed or drawn, the brakes shall be operated by force or pressure on the draw-bar in a direction contrary to that of the force or pressure received by said bar while the car was being propelled, substantially as herein described.

In testimony whereof I have hereunto set my hand this 8th day of May, A. D. 1880.

BENJAMIN L. STOWE.

In the presence of—
NATHAN STOWE,
ROBERT SCOBIE.