

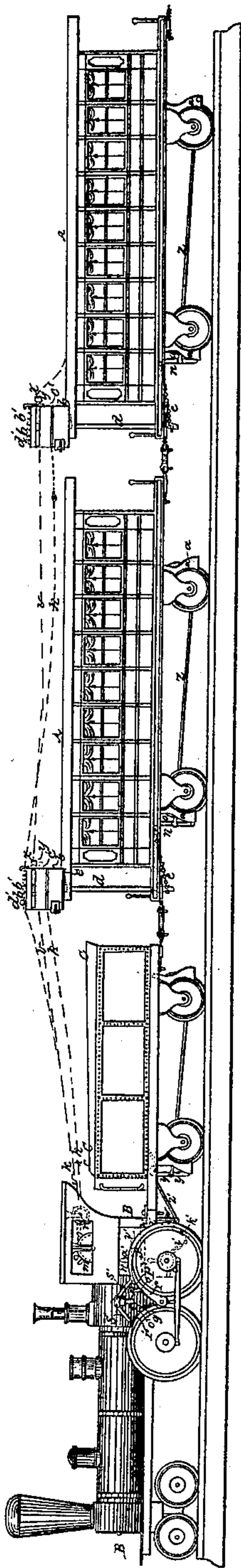
No. 10,701.

J. MARKS.  
Car Brake.

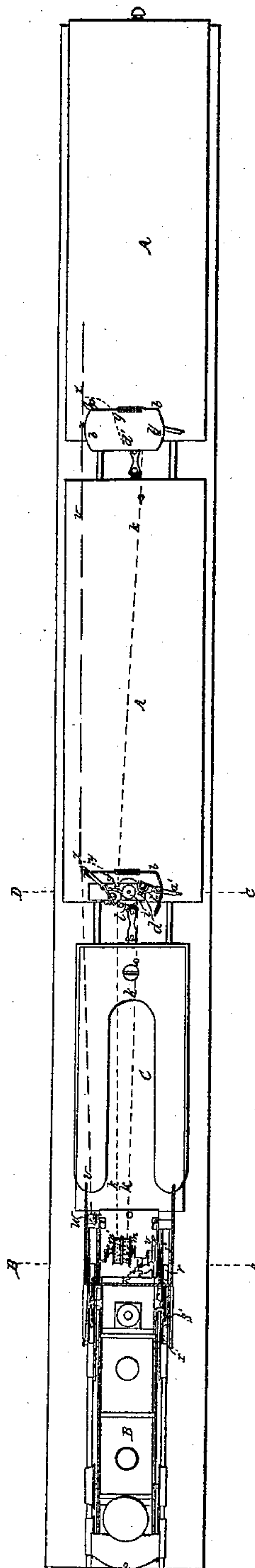
2 Sheets—Sheet 1.

Patented Mar. 28, 1854.

*Fig. 1.*



*Fig. 2.*



J. MARKS.

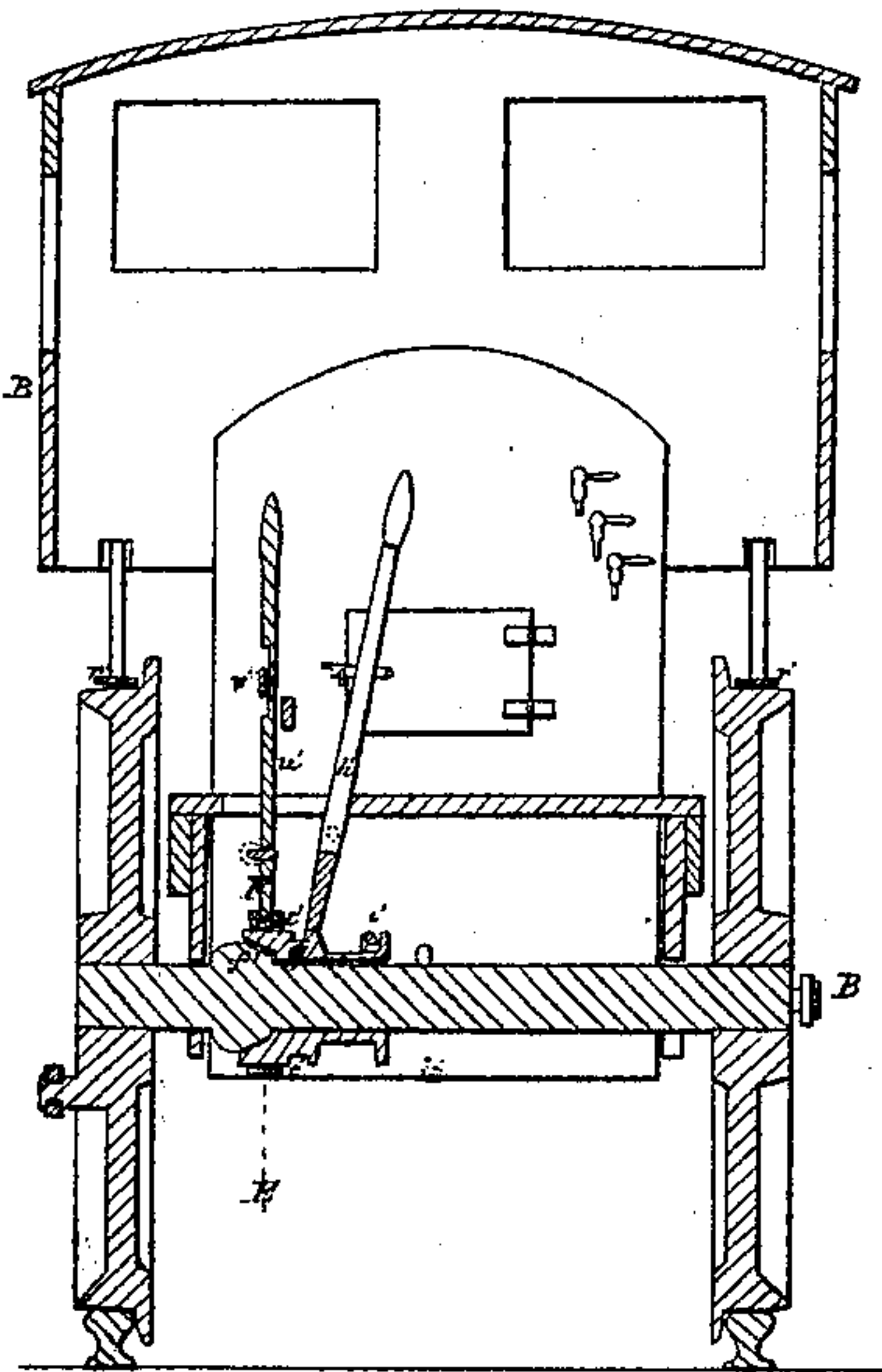
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Car Brake.

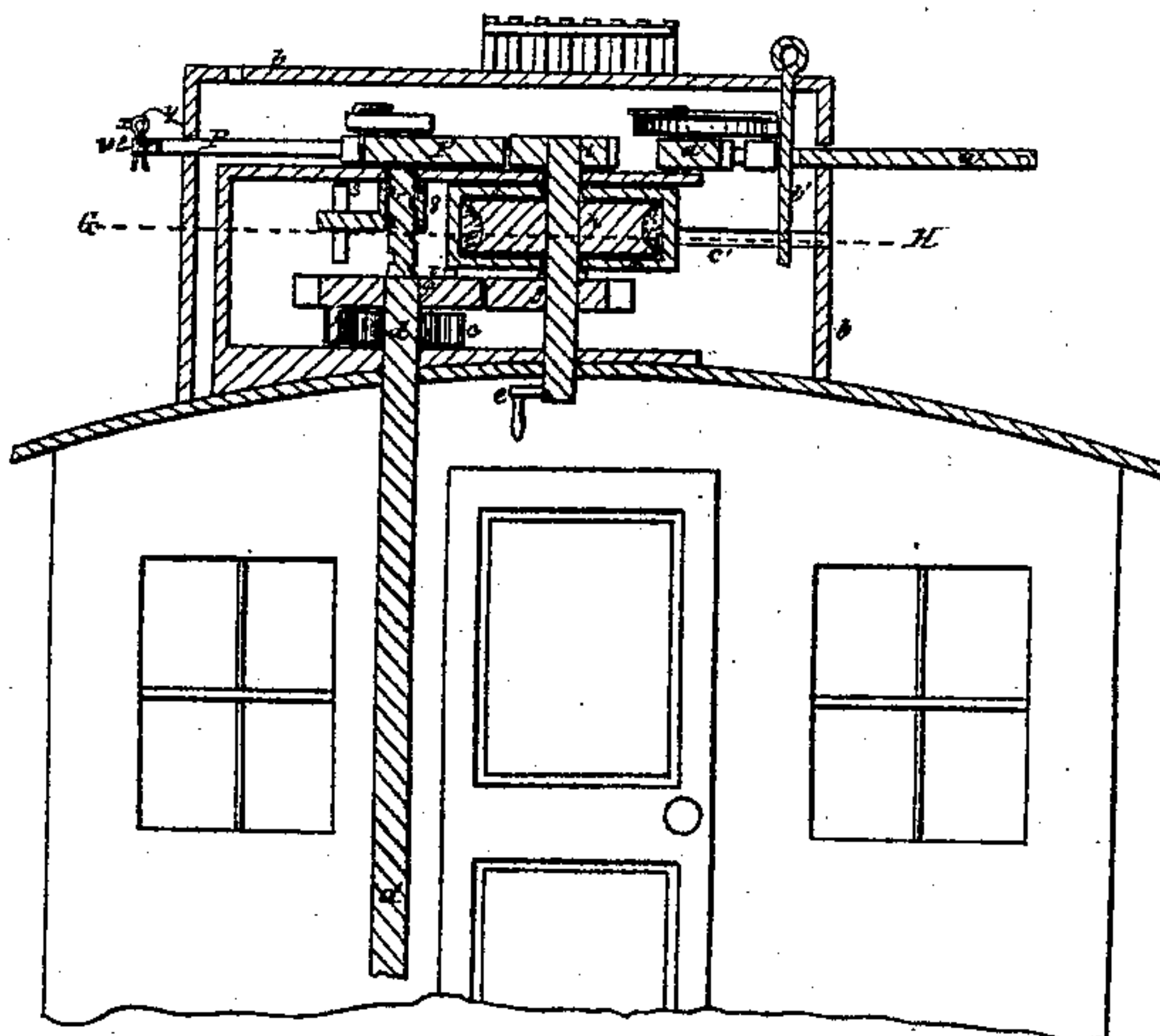
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*Fig. 3.*



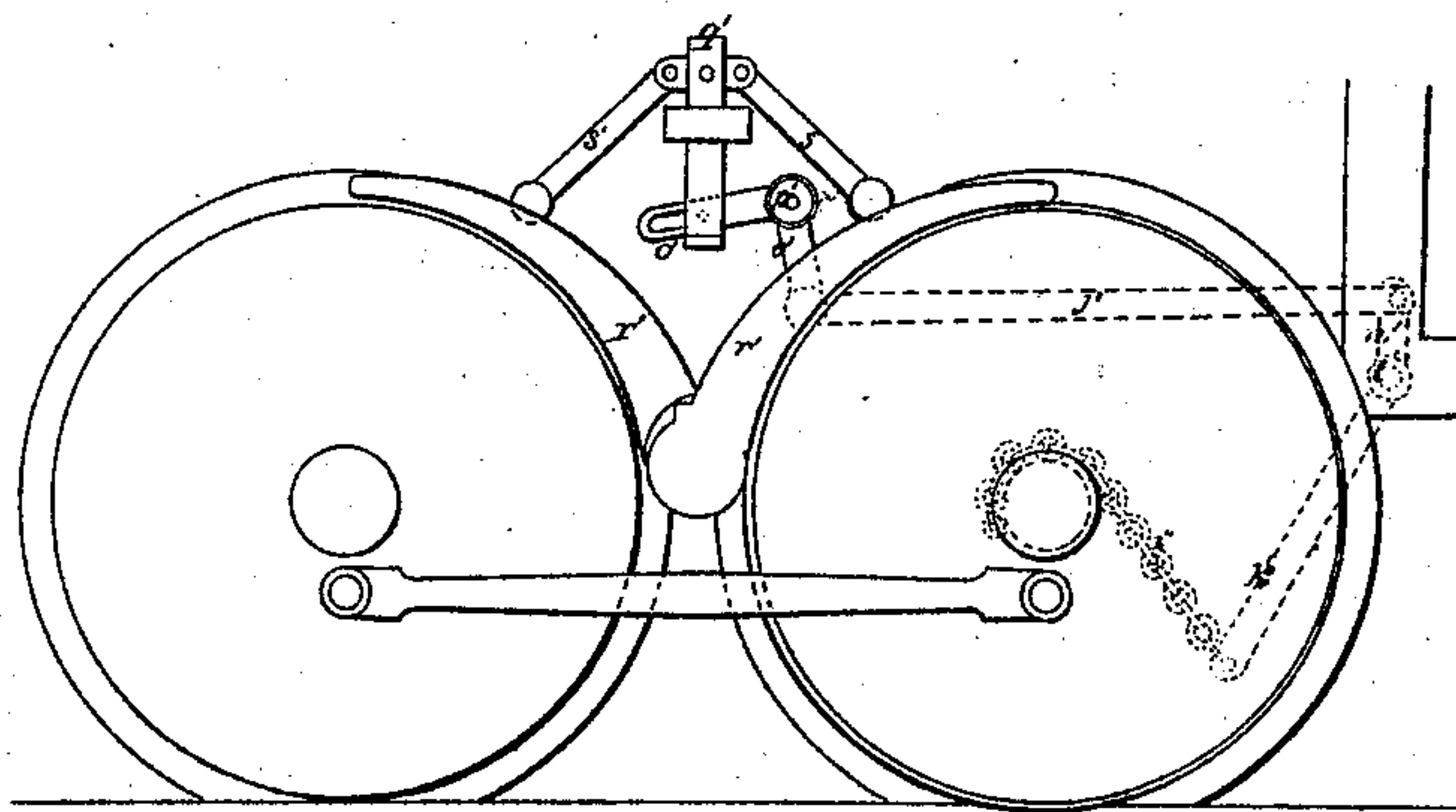
*Fig. 4.*



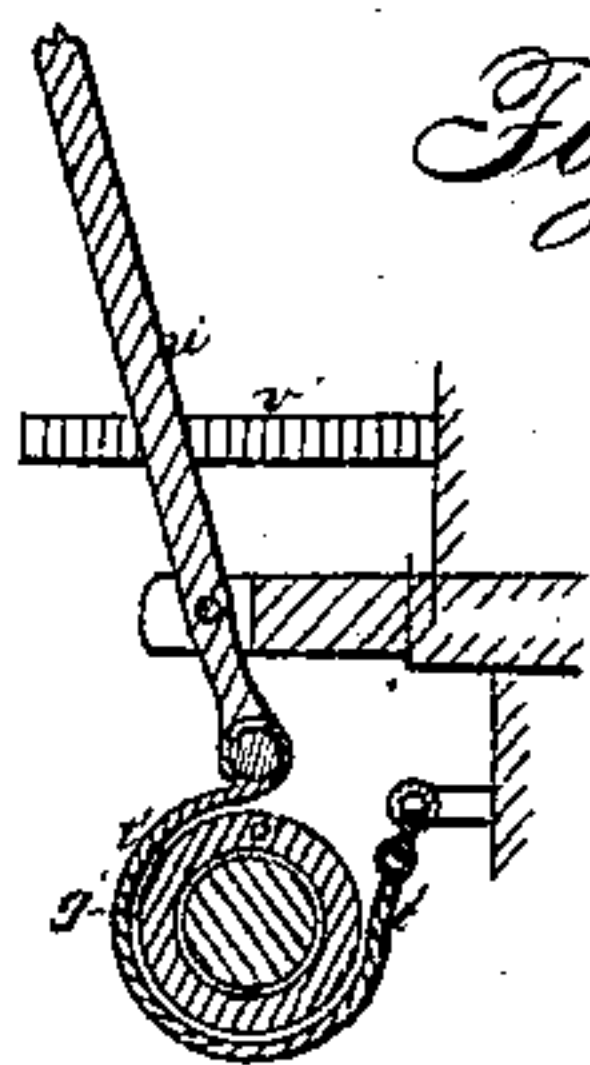
*Fig. 5.*



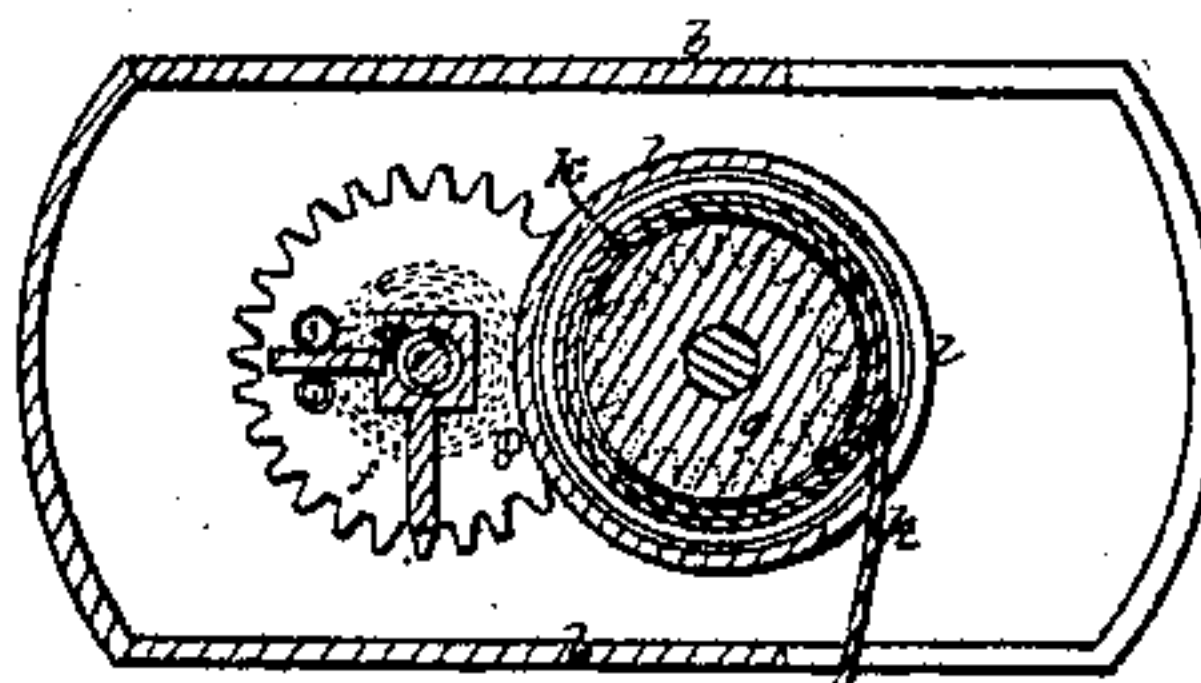
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*





# UNITED STATES PATENT OFFICE.

JOSEPH MARKS, OF DUNKIRK, NEW YORK, ASSIGNOR TO WM. WHITING, OF ROXBURY, MASSACHUSETTS.

## MACHINE FOR OPERATING CAR-BRAKES.

Specification of Letters Patent No. 10,701, dated March 28, 1854.

*To all whom it may concern:*

Be it known that I, JOSEPH MARKS, of Dunkirk, in the county of Chautauqua and State of New York, have invented certain  
5 new and useful Improvements in the Method of Operating Railroad-Car Brakes, and that the following description, taken in connection with the accompanying drawings hereinafter referred to, forms a full and exact  
10 specification of the same, wherein I have set forth the nature and principles of my said improvements by which my invention may be distinguished from others of a similar class, together with such parts as I claim  
15 and desire to have secured to me by Letters Patent.

The figures of the accompanying plates of drawings represent my improvements.

In Plate 1, Figure 1 is a side elevation of  
20 a train of cars with my apparatus attached. Fig. 2 is a plan or top view of the same, with the top of the engineer's room removed. In Plate 2, Fig. 3 is a transverse section of the locomotive, taken in the plane of the  
25 line A B Fig. 2, Plate 1, showing the brakes applied to the engine and tender. Fig. 4 is a section of the apparatus for applying the car brakes, taken in the plane of the line C D, Fig. 2. Fig. 5 is a detail view which  
30 will be hereinafter referred to. In Plate 3, Fig. 6 is an enlarged side view of a portion of the locomotive. Fig. 7 is a transverse section of a portion of the locomotive taken in the plane of the line E, F, Fig. 3, Pl. 2.  
35 Fig. 8 is an enlarged horizontal section of the car brake apparatus taken in the plane of the line G, H, Fig. 4, Pl. 2.

The object and purpose of my invention is to prevent collisions or other casualties  
40 on railroads, by providing an arrangement for speedily checking the train when in motion, by giving the engineer the control of all the brakes, and the means of operating them all at once or separately. This de-  
45 sideratum is effected by my improvements, and in such a manner as not only to make provision for many contingencies which usually occur in a railway train, but so as to provide for accidental occurrences, such as  
50 the unshackling and consequent disconnection of a car,—the car brakes being operated equally well at either end of the train, and the brakes of each car being managed if necessary independently of the others.

55 I have also adopted a peculiar arrangement of mechanical devices for operating

the brakes of the locomotive and tender, by which they can be applied with sufficient power to stop the train under ordinary circumstances, without having recourse to the  
60 car brakes.

A A A A, Figs. 1 and 2, Plate 1, represent the cars connected to each other, and attached to the locomotive B B and tender C C in the usual manner.  
65

The mechanism by which the car brakes *a, a, a, a* are operated, is arranged in a box *b b—b b* placed on the top of each car. The power, by which the brakes are applied, consists of a spiral spring *c*, Fig. 4, Pl. 2, and attached to the vertical shaft *d d*, upon the lower end of which is wound the chain *e* which applies the brakes, as will be hereinafter explained. The spring *c* is coiled up and the brakes relieved from the wheels as  
75 follows,—On the shaft *d d*, which extends up through the box *b b*, is placed the gear wheel *f*, the teeth of which engage with those of the gear *g*, on the same shaft with the pulley *h* and ratchet wheel *i*. On the  
80 pulley *h*, is wound the line *k k*, kept in place on the same, by the barrel *l*, which line passes directly to the engineer's room, and is wound upon the drum *m, m'*. By the above arrangement, the engineer in winding  
85 up the line *k k* upon the drum *m, m'*, will, through the medium of the pulley *h* and gears *g, f*, coil up the spring *c*, and turn the shaft *d d*, relieving the chain *e* from the arm *n*, attached to the brake, which is  
90 thrown off from the wheels by the bent spring *o*. A pawl lever *p p* engages with the ratchet *i*, and holds the gears in position, as fast as they are turned by the line *k k*, so as to prevent the spring from un-  
95 coiling. When the spring *c* is sufficiently coiled, the pulley *h* is prevented from being turned any farther, by the traversing nut *q* (which travels up or down as the shaft *d d* is turned, on the screw *r*, cut in the said  
100 shaft) striking against a stud *t* on the gear *f*, the nut *q* being prevented from turning by the pins *s, s*, which embrace a projection of the said nut as will be readily understood by inspection of Fig. 4, Plate 2. The  
105 operation of "taking off" the brakes as above described, brings the mechanism in the box *b b* into position for instantly applying the brakes again, as will be seen in the sequel.  
110

The lines for "taking off" the brakes proceed from each car separately, and are



wound loosely upon the drum  $m, m'$  composed of two or more pulleys  $m, m'$ , according to the number of cars. These pulleys are arranged so as to turn separately or all at once, by means of ratchet wheels  $t'' t''$  and spring pawls  $u$ , as shown in Fig. 5, Plate 2, so that, the lines can be tightened or loosened at pleasure, or the brakes taken off from one car at a time.

The brakes are applied, by the engineer all at once in the following manner. A line  $v v$  passes from a pulley  $w$  in the engineer's room through the end of the lever  $p p$  on each car. A spring clip  $x$ , (formed of a bent piece of metal which embraces the line) on the cord  $y$ , fastened to the box  $b b$  is sprung upon the line  $v v$  near the end of the lever  $p p$ . When the engineer pulls the line  $v v$ , the spring clips will hold rigidly enough upon the line to strike against the pawl lever  $p p$ , and detached it from the ratchet  $i$ , thereby allowing the spring  $c$  to uncoil and turn the shaft  $d d$ , which will wind up the chain  $e$  attached to the arm  $n$ , and thus apply the brakes, the communication between the brakes of each car being formed by the rods  $z z$ . In case any car should become unshackled and disconnected from the train, the spring clips will first, through the pulling of the line  $v v$ , strike against the pawl lever  $p p$ , detach it from the ratchet wheel and thus apply the brakes. The line will be drawn through the pawl lever and spring clips, which hold on the line only by friction, by the engine, without being and at the same time, giving notice to the engineer through the line  $v v$ . A pawl lever  $a' a'$ , exactly similar to the pawl lever  $p p$ , engages with the ratchet wheel  $i$  on the opposite side, and is to be used when the engine is attached to the other end of the train, the line  $v v$  in this case being detached from the lever  $p p$ , and connected to the lever  $a' a'$  which is operated in the same manner. But one of these pawl levers engages with the ratchet  $i$  at a time, being relieved from the same, and held by a pin  $b'$  passing through the casing of the box  $b b$ . The line  $k k$  for "taking off" the brakes, is passed in this case through a slot  $c'$  of the box, the barrel  $l$  of the pulley  $h$  being also turned in the opposite direction, and fastened by a pin  $d'$ . In order that the conductor may readily communicate with the engineer, and give warning of danger, a crank  $e'$  is attached to the shaft of the pulley  $h$ , and placed so as to be easily accessible. By turning this crank the line  $k k$  will be unwound from the drum  $m m'$  in the engineer's room, and thus signalize the engineer to apply the brakes.

I shall now proceed to describe the arrangement of mechanical devices, by which the brakes of the locomotive and tender are worked. On the rear axle of the locomotive

is formed a friction cone  $f'$ , with a loose collar  $g'$ . By the lateral action of a hand lever  $h'$ , this collar is forced on to the friction cone  $f'$ , thereby causing the said collar to make a few revolutions with the axle. To the collar is attached a chain  $i'$ , which is wound upon the same by its revolution with the axle, and pulls upon the arm  $k'$  attached to the turning shaft  $l'$  which operates the long rod  $j'$  through the arm  $n'$ . The action of this rod  $j'$  moves the bent lever  $o' o'$ , (turning on a fulcrum at  $p'$ ) thus depressing the vertical sliding rod  $q'$  which applies the brakes  $r' r'$  through the toggle joint  $s' s'$ . As soon as the collar  $g'$  has, in the judgment of the engineer wound the chain  $i'$  sufficiently tight, the said collar is grasped and rigidly held, so as to prevent its turning any further, by a spring band  $t'$  Fig. 7, Pl. 3, worked by the hand lever  $u'$ , held in any desired position by the rack  $v'$ . The collar  $g'$  is then relieved from the friction cone by the hand lever  $h'$ , the rack  $i'$  holding the hand lever  $u'$  and keeping the amount of strain upon the brakes, which has been gained by the action of the collar upon the friction cone of the axle. The brakes of the tender are applied at the same time from the axle of the locomotive, by the arm  $w'$ , also attached to the turning shaft  $l'$ . This arm  $w'$  is connected to the jointed lever  $y' y'$  attached to the brakes of the tender by a chain  $z'$ . By this mode of working the brakes of the locomotive and tender, they can be applied with sufficient power to stop the train under ordinary circumstances, obviating the necessity of using the car brakes, except in cases of emergency.

By the above described arrangement for operating the car brakes, various contingencies which may occur in a railway train are amply provided for, and I shall now proceed to state some of the difficulties which are avoided, and the advantages obtained by my improvements.

In various devices, which have before been adopted for operating all the brakes by one person, no arrangement has been made by which the "loose motion" or play between the cars could be provided for. In my apparatus, the "loose motion" is easily prevented from pulling the line, and applying the brakes, by the spring clips, which are placed at any required distance from the pawl lever, so that the line will have to be drawn a considerable distance in order to detach the said lever from the ratchet wheel and apply the brakes. As the power which applies the brakes exerts a constant force, the said power being a yielding spring, allows the truck frame to swivel in going around a curve, and thereby prevents its being thrown off, which result when the brake is unyielding, as in ordinary cases, is very liable to occur.



It will be seen that after the engineer has applied all the brakes, he has the power by the above described arrangement to take them off all at once or separately and at the same time by the operation of taking them off, he brings the mechanism into position for instantly applying them again. It may be observed however, that, as the engineer in relieving the brakes from the wheels, has to wind against the power of the spring, he cannot take off the brakes of more than six cars, and in a long train, an extra windlass attached to one of the cars would be required, in order to take off the remainder of the brakes.

As it is often necessary for the engine to be detached from the train, in order to switch off the car brakes, in this case, may be operated by one brakeman on the first car, the lines running off from the windlass in the engineer's room without breaking.

From the above it will be seen that while with many other kinds of brake mechanism in use, the power by which the brakes are forced against the wheels emanates directly from a person, my invention presents a different principle, for by it the office of the person or attendant is not to generate such power, but simply to bring into operation a power all ready for instantaneous action, and at a subsequent period set the brakes free, and arrange the power so that it will again act, and with instantaneous effect, and by means of the engine brake apparatus, the engineer can apply more or less friction to the driving wheels of the locomotive and wheels of tender and retain or ease off this friction or any part of it instantly. The engineer also can apply the car brakes to the last or most distant car in the train or to all at once, or in succession, at his option by arranging the position of the spring clips accordingly, and he can regulate the amount of friction which the springs shall produce by adjusting the springs in the box placed on each car.

There are a variety of modifications which may be adopted both in the manner of holding the spring and setting it free, and also in the method of regulating the amount to which the spring shall be coiled, among which may be mentioned the following. The pawl can be thrown off from the ratchet and again put in connection therewith by winding the lines which applies the brakes upon a hollow pulley on the side of the box. In this pulley may be placed a spiral spring the coiling and uncoiling of which (by turning said pulley) will turn a screw shaft, attached by a corresponding nut to the pawl and thus give a lateral or sliding motion to the pawl and engage it with or disengage it from the ratchet. The spiral spring instead of being placed as shown in the drawing, can be placed over the gear *f*, and the screw upon the shaft *d d* with its traveling

nut, dispensed with, by forming on the underside of the gear *f* a spiral groove in which may travel a pin attached to a sliding bolt on the bottom of the box, so that the turning of the gear *f* will give a lateral motion to the said bolt, a pin in which, when the spring is sufficiently coiled will strike against a stud on the underside of the gear *f* and thus check its further revolution.

Having thus described my improvements in the manner of operating the brakes of a railway train I shall state my claims as follows: I do not claim any mode of forcing the brakes of one or more cars against their respective wheels, by any mechanism, brought into action by a power generated on an axle of the engine, but

What I do claim and desire to have secured to me by Letters Patent, is—

1. I claim the adjustable spring clip or clips *x* in combination with the pawl lever or levers and the draft rope *v v* thereof, and as applied and made to operate substantially in the manner as specified.

2. In combination with the cord extending from the locomotive to the brake shaft *d, d*, and the pulley *h*, I claim the traveling nut *q*, screw *r*, stud *t*, and pins *s, s*, in the manner and for the purpose substantially as specified.

3. I also claim the combination of the lines and the mechanism for operating the same as described, whereby the several brake springs of a train of cars may be wound up simultaneously, or one or more of them at a time as required in combination with the line and the mechanism for operating the same, the several brakes of the train may be either simultaneously or one or more at a time put in action to retard or arrest the motion of the cars.

4. Finally I claim generally in my improved method of operating car brakes the combination of main springs for pressing the brakes against the wheels, mechanism for winding up the springs so as to remove the pressure from the brakes and to hold the springs in a state of tension ready to apply pressure on the brakes instantly, on being released, and mechanism to release the springs and allow them to act, both the mechanism for winding up and that for releasing the springs being so constructed and arranged that it can be operated on either the locomotive or on the separate cars, and also capable of such adjustment that the brakes of all the cars can be either simultaneously, or one or more at a time, and in any required order of succession put in action.

JOSEPH MARKS.

Witnesses:

JOSEPH GAVETT,  
ESRA LINCOLN.