

T. E. SICKELS.
APPLYING BRAKES TO RAILROAD CARS.

No. 16,884.

Patented Mar. 24, 1857.

Fig. 1.

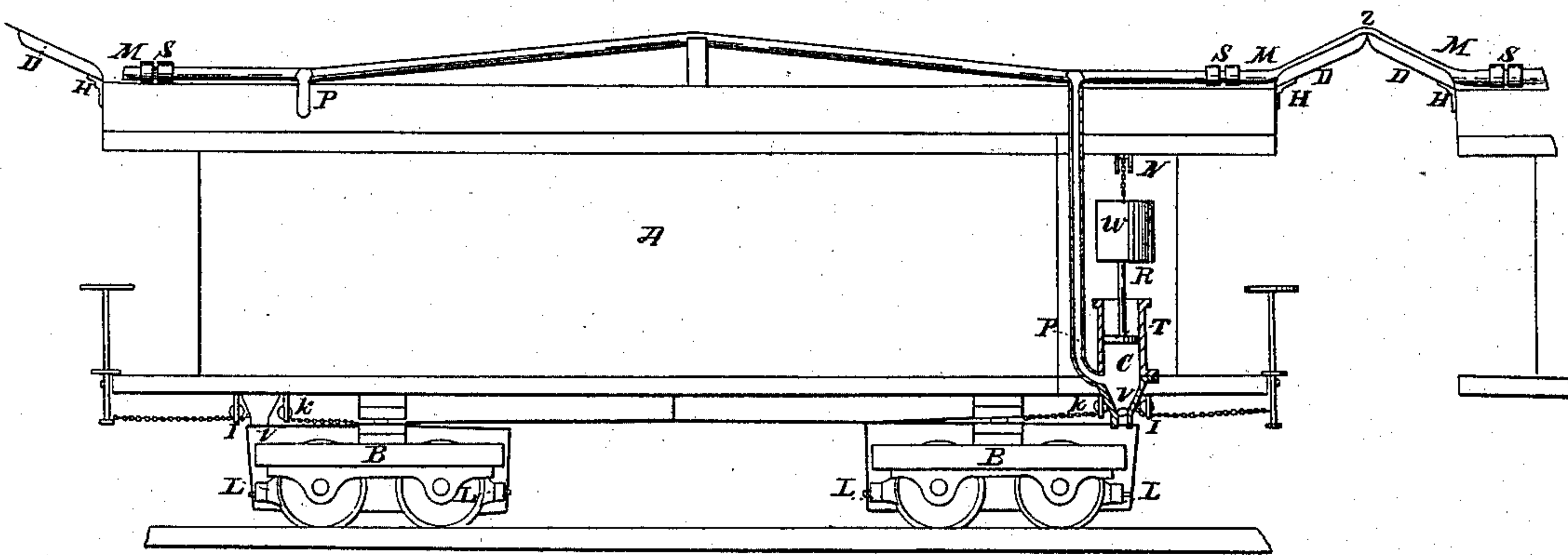


Fig. 2.

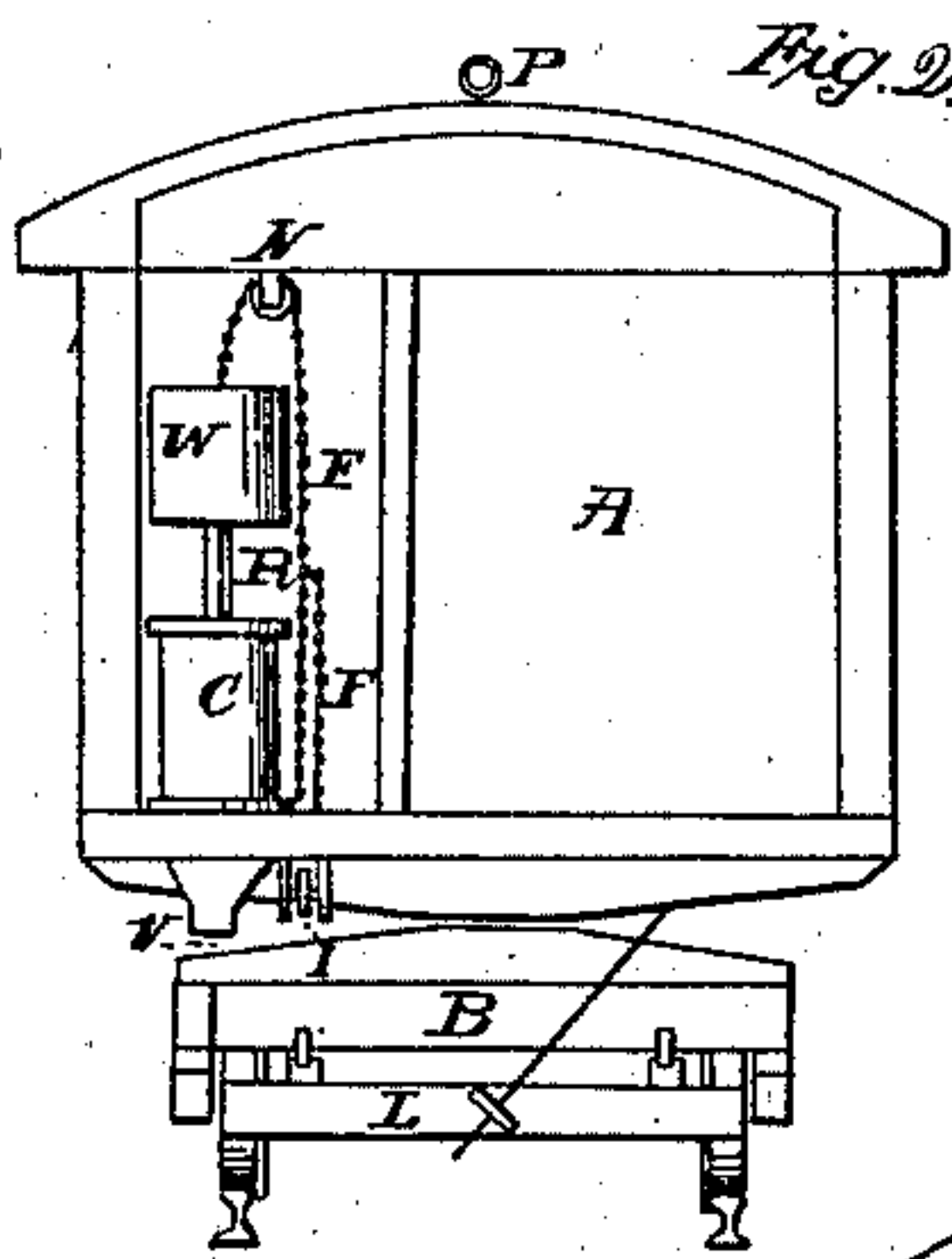
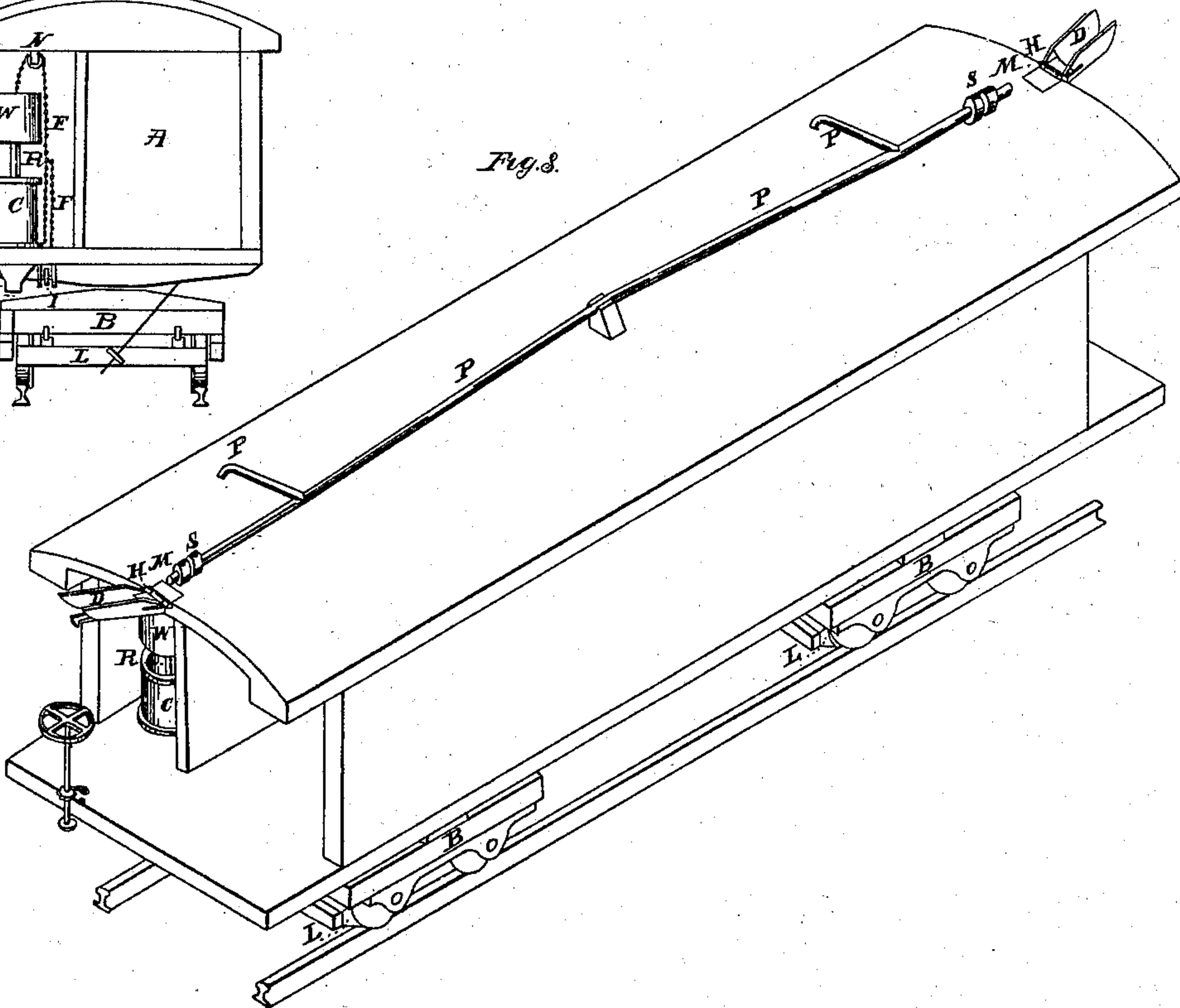


Fig. 3.



UNITED STATES PATENT OFFICE.

THEOPHILUS E. SICKELS, OF KENNETT SQUARE, PENNSYLVANIA.

IMPROVEMENT IN STEAM-BRAKES FOR RAILROAD-CARS.

Specification forming part of Letters Patent No. 16,884, dated March 24, 1857.

To all whom it may concern:

Be it known that I, THEOPHILUS ELSWORTH SICKELS, of Kennett Square, county of Chester, and State of Pennsylvania, have invented a new and useful Method of Applying Brakes to Railroad-Cars and of Arresting the Operation of the same, of which the following is a specification.

In the accompanying drawings, Figure 1 is a side view of a railroad-car with a portion of the outside removed, so as to show the arrangement of the weights and cylinders. Fig. 2 is a section immediately in front of the cylinder and an end view. Fig. 3 is an isometrical perspective view of the car.

Referring to the accompanying drawings, A is a car constructed after the usual form of railroad-cars, together with the trucks B and brakes L, which are also of the usual construction.

My improvement consists of appliances as follows, to wit:

P P are pipes about two and one-half inches in diameter, which lead from the locomotive and extend over each car. The pipes may be constructed of any material presenting sufficient strength to resist the pressure to which a locomotive-boiler is subjected when in use, except that portion of the pipes for about six feet in length, M, extending from one car to the car next adjoining, which should be of india-rubber, gutta-percha, or of other material to admit without injury to their efficiency of a certain amount of vibratory motion required in their use.

S S are sleeve-joints for the ready attachment of the pipes. To each car are two vertical pipes leading down from the main pipe to cylinders C C. At the bottom of each cylinder is a reservoir having a small opening in the bottom thereof, which is ordinarily covered by a valve, V.

T is a piston moving in the cylinder C, to which is attached the rod R. At the upper end of this rod is a heavy weight, W, formed of cast-iron or other proper material, which should weigh about three hundred and fifty pounds. This weight is constrained by guides, (not shown in the drawings,) by which it is secured to move in the line with the piston-rod. To this weight a chain, E, is attached, which passes over the pulley N, descends to below the floor of the car, passes over another pulley, K, and thence extends to the end of

the lever of the brakes L L. Another chain, F, attached to this chain E, extends to the pulley I below the floor of the car, and then extends to the shaft of the brake-wheel at the end of the car, which is of the ordinary construction.

D D are wooden arms moving on hinges H H, by which they are permanently secured to the cars, and having a trough for the reception of the pipe or hose extending from one car to another. These wooden arms are connected together by hooks and pins, so as to be readily attached or detached.

When the train of cars is elongated by the action of the drawing springs, the points Z are depressed, and when by the same action the train is diminished in length the point Z is elevated. Thus the connecting hose or pipe M, resting on the arms D D, may be of a certain prescribed length, depending on the amount of play in the drawing springs.

The operation of my brake may be described as follows: When the cars are detached from the engine, the weight W, suspended by the chain E, draws the brakes against the wheels with a force sufficient to cause the wheels to slide, instead of rotating, if motion is communicated to the car. Should it be desirable to suspend the action of this weight, it may be done by winding on the brake-wheel until the weight W is so far elevated as to cause all pressure by the brakes against the car-wheels to be removed. When a train is all connected together and to the locomotive in the ordinary manner, the first operation is to connect the pipes P between each car, and also a pipe leading to the steam-chamber of the locomotive. Next the hand brake-wheels are unwound, so that the weight W may cause pressure of the brakes against the wheels of the cars. In the pipe leading to the steam-chamber of the boiler is a cock, by means of which steam may be admitted to the pipes P P, or shut off therefrom. When the train is ready to start, the engineer, by means of this cock, admits steam to the pipes P P, and thereby to the under side of the pistons T T. These, being forced upward by a pressure considerably greater than that of the weights W acting in a contrary direction, are raised, whereby the brakes are removed from the wheels of the cars, and the train is free to start. The cock in the pipe leading to the steam-chamber of the locomotive is what is known as a "four-way

cock." A certain amount of motion to this cock admits a full head of steam from the boiler to the pipes P P. An additional motion nearly cuts off the steam and leaves but a small orifice leading to the pipes P P, being only large enough to supply an amount of steam adequate to maintain pressure in the pipes sufficient to prevent the weights W from descending, and an additional motion of this cock wholly cuts off the flow of steam from the boiler to the pipes P P, while at the same time it opens a communication from these pipes to the external atmosphere. When the engineer wishes to apply the brakes, he turns this cock until he has cut off the connection with the boiler, and has opened a communication from the pipes P P with the external atmosphere, which being done, the steam rushes with great velocity from the pipes P P, and thereby allows the weights W to force the brakes against the wheels of the cars. If he wishes to stop as suddenly as possible, he opens to its full width the communications with the atmosphere, whereby the weights W W, acting with their full force, cause the brakes to be applied and the wheels of the cars to slide, and thereby to arrest the motion of the train; but if he wishes to more gradually diminish the velocity of the train he allows the steam to escape gradually, and by so doing causes but a portion of the weights W W to act upon the brakes. To avoid condensation of the steam, the pipes should be, as far as practicable, surrounded with some suitable non-conductor, and the whole be inclosed in a wooden box.

The arrangement of the pipes as shown in the drawings is such as to lead the condensed water to the descending pipes, whence it is collected in the reservoir immediately below the cylinders c c. The valve in this reservoir is so adjusted that it will retain its seat until a certain amount of water has accumulated in the reservoir, when, by its buoyancy, it rises and discharges the accumulated water. I am aware that this valve may not act while there is a pressure of steam upon the water; nor is it material that it should, for should the condensed water fill the reservoir and even the cylinder, the steam-pressure acting on the water will still cause the weights to be upheld, and when the steam-pressure is removed these weights will fall again, and then the valve will act to discharge the accumulated water.

At about the center of each car there should be a cock in the steam-pipe with a handle extending down into the car. By turning this cock the steam may be allowed to escape from the pipes, and thereby the brakes applied throughout the train, as the small orifice leading to the pipes from the boiler (which, after the train is in motion, is only large enough to supply an equivalent for the condensed steam,) would be wholly insufficient to maintain a pressure in the pipes adequate to support the weights W W. By attaching a whistle to the cock it would afford the means of the

conductor communicating with the engineer, and thus supersede the necessity of using any bell-rope. It will be seen, therefore, that all the brakes may be applied either by the engineer or by any person upon any car in the train; and it will also be seen that an accident to any part of the train sufficient to cause a fracture in the steam-pipes will, of itself and without the action of any person, cause all the brakes to be applied almost instantaneously. It will be apparent, also, that, in this possible event of any disarrangement to the steam-pipes, there remains the ordinary hand-brake, to be used as effectually as it can now be done upon cars to which my improvement has not been applied.

Condensed air or other gases may be used in place of steam in the above-described apparatus, and may possibly be entitled to a preference. In case condensed air should be used there would be required a reservoir in which to condense the air, which for a train of ten cars would not require a content of over ten cubic feet. Another arrangement, which in some respects would be preferable to that before described, is to use a spring instead of the weight W. This could be so located as not to occupy any room inside of the car, being placed either on top of the car or under the floor. In fact, the modifications of the arrangements are endless for applying the principle of forcing the brakes against the wheels by a weight or mechanical equivalent, and of suspending the action of the same weight or mechanical equivalent by means of a piston operated upon by steam or other compressed or expansive gases.

I am aware that steam-brakes have been used by which they are brought into use by the action of steam in forcing them against the car-wheels, and also that brakes have been used which were forced against the car-wheels by the action of a spring, but the use of a spring or mechanical equivalent bringing the brakes into operation, in combination with the use of steam or other gases for arresting the operation of the brakes, is new and original with me.

Having thus fully described the nature of my invention, and shown wherein it differs from all other things for a similar purpose, I would state that I do not claim the use of steam for holding the brakes to the wheels of railroad-cars, as this has been done; but

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

The so combining the use of steam or its equivalent with the brakes of railroad-cars as that the steam shall hold the brakes from the wheels, and its partial use or disuse admit a weight or spring to apply said brakes, in a manner substantially as herein described.

THEOPHILUS E. SICKELS.

Witnesses:

ABNER O. NASH,
JOHN ROGERS, Jr.