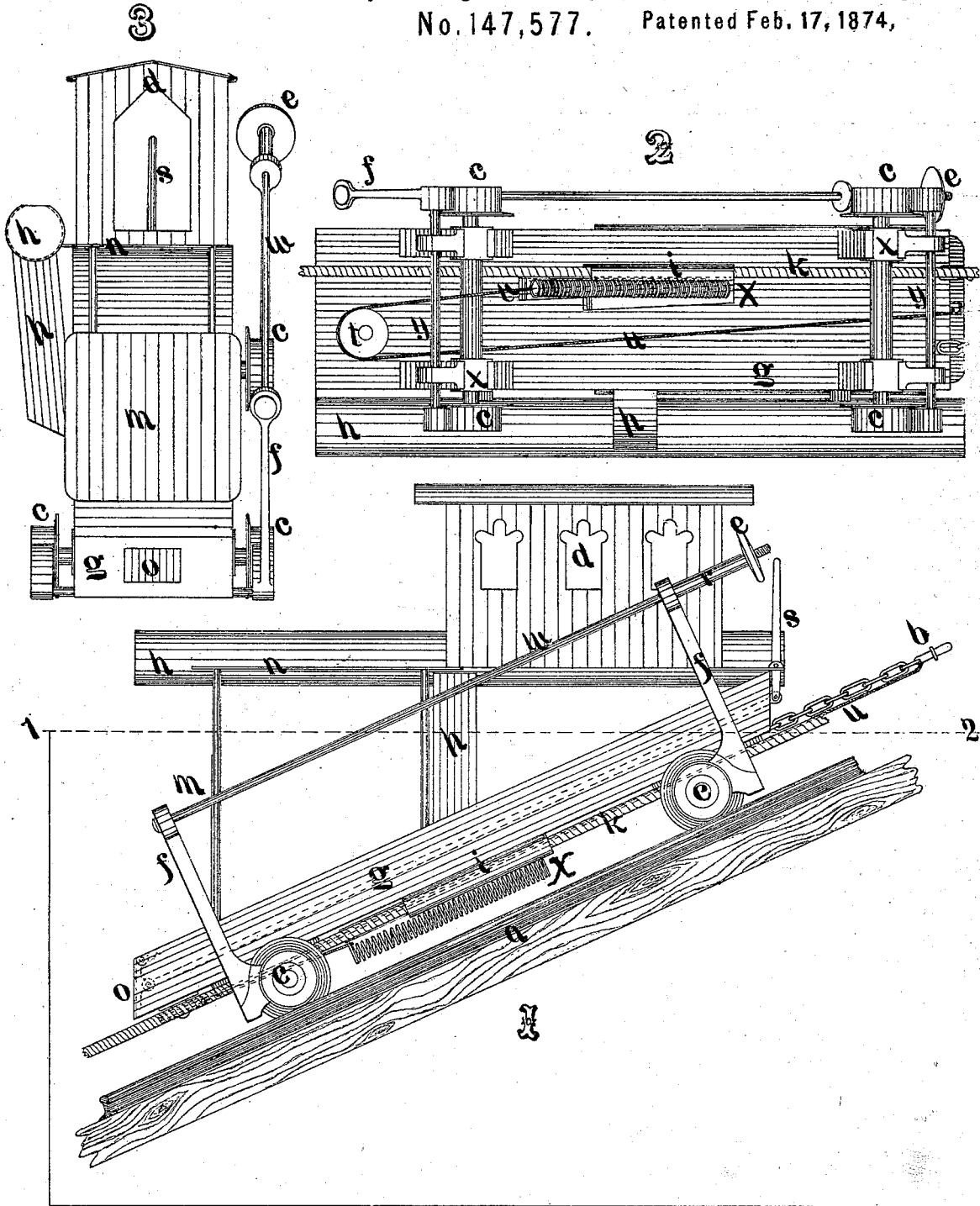


**T. SHAW.**  
**Mechanisms for Propelling Cars upon Inclined Railways.**  
 No. 147,577.      Patented Feb. 17, 1874.



**Witness.** James Keenan  
Wm. F. Booy

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# UNITED STATES PATENT OFFICE.

THOMAS SHAW, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN MECHANISMS FOR PROPELLING CARS UPON INCLINED RAILWAYS.

Specification forming part of Letters Patent No. **147,577**, dated February 17, 1874; application filed August 19, 1873.

*To all whom it may concern:*

Be it known that I, THOMAS SHAW, of the city and county of Philadelphia, Pennsylvania, have invented a new and Improved Method of Working Cars on Incline Planes; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing and to the letters of reference marked thereon.

My invention consists in the within-described mechanism to enable the operating of cars on incline planes by water. The object of the invention is to reduce the cost and increase the safety of working cars on incline planes.

In order to enable others to use and practice my invention, I will proceed to describe its construction and operation.

On reference to the accompanying drawings, which form part of the specification, Figure 1 represents a side view of the car located at base of plane, and Fig. 2 is a bottom view of the car, and Fig. 3 is an end view of the same.

Similar letters refer to similar parts throughout the several views, of which—

*a* is an ordinary inclined railway, rolling upon which are ordinary car-wheels *c*, secured to common axles working in journals *x*, said journals being secured to a metallic tank, *g*, supported upon which is the platform of the car *u*, and car-body *d*. *h* is a trough communicating, through a spout, *p*, with the tank *g*. Said tank *g* has a valve, *o*, which opens inward, and connects with a lever, *s*, by means of the rod shown in dotted line, Fig. 1. *f f* are brake-levers, hinged at their lower ends to axles *y*, which work in the outer ends of journal-boxes *x*, Fig. 2. Said brake-levers are caused to press upon the periphery of the car-wheels by means of a rod, *w*, provided with a screw hand-wheel, *e*, under control of the operator. *r* is space allowed for a gum spring, to enable the force to be applied gradually. *i*, Figs. 1 and 2, is a vice-box, secured firmly to tank *g*, through which box passes, as the car moves, a stationary cable, *k*. Said box is provided with a wedge, *v*, Fig. 2, and a spiral spring, *X*, secured on one end to box *i* and at the other end to the butt-end of wedge *v*. Said spring is under a strain, tending to pull the wedge inward. *u* is a cord, secured to butt-

end of said wedge, and passes over pulley *t*, and thence to the main chain cable-link *b*, all for the purpose as hereinafter described.

The operation of the cars is in this wise: Two cars are located on parallel tracks of the same plane, one car at the base, and the other at the top of the plane, in the usual manner. The main cable connecting the cars is passed over an ordinary rope-pulley at the top of plane, and is united to link *b* of the chain connected with the car. The base of the plane is provided with a sump or space dug out of the earth, so as to allow its being filled with water to line 1 and 2, Fig. 1, and the top of the plane is provided with a running stream or tank of water, from which a supply of water can be had at that point. The tank *g* at the bottom of the plane is always filled with water to line 1 and 2, Fig. 1, the water entering through the valve *o*. Now, in case the car at the top of the plane is heavily loaded with passengers and freight, while the bottom car is light, the operator, stationed upon the latter, will retain the water in tank *g*, to counter-balance the weight in the down-coming car, and thus water is hauled up the hill; and in case the load of passengers and freight is heaviest on the car at the base of the plane, then, in that case, the operator at the base will allow the water to escape from his tank *g* by opening the valve *o*, by means of the lever *s*, and if this does not make the bottom car sufficiently light, the operator at the top of the plane will take a load of water from the source of supply by throwing a hose into the trough *h*, and allowing water to flow in until his car is made the heaviest, when it will be allowed to move off, the speed being controlled by the operator regulating the pressure of the brakes by means of the hand-wheel *e*. The dash-board *m* exposes a large surface broad-side to the water, and offers great resistance to a rapid entrance or exit from the water, and thus far lessens liability to accident from too high a rate of speed, and the tanks *g*, being of a capacity largely in excess of any intended load to carry, it is impossible to start the car without allowing water to escape from the bottom tank, which is another element of safety, under control of the operator. The stationary cable *k* is firmly secured to top and

bottom of plane, and the car passes over the same, the cable sliding freely through vice-box *i*, so long as the wedge *v* is held out by means of cord *u*, which passes over pulley *t*, and is united to chain-link *b*; but in case the main cable that connects the two cars should break, the cord *u* will then slacken its strain, and the spring, connected with the wedge *v*, will force the same hard upon the stationary cable *k*, and so soon as the wedge pinches upon the cable it will be further drawn in by the friction induced, until it presses hard enough upon said stationary cable to arrest the motion of the car, and thus prevent destruction when the main cable breaks.

It will be evident that the shape of the car and tank can be variously modified, and that the vice-box *i* can be variously shaped and located without any alteration in the result.

I do not wish to claim the balancing of two cars or carriages on parallel tracts of inclined railways, as that is a common device used in every slope of coal-mines; nor do I wish to claim the operation of cars on inclined rail-

ways by the descent of weights, as that is a common device employed to lower stone from elevated quarries; nor do I wish to claim the counterbalancing of the loaded descending carriage or car by hauling water up with the ascending car, as that is a common device, used in the slopes of coal mines; but

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

1. The tank *g*, in combination with truck-wheels *c*, valve *o*, car-body *d*, and the described sump, as and for the purpose specified.

2. The dash-board *m*, in combination with the car *g d* and the sump at the foot of the incline, as and for the purpose specified.

3. The vice-box *i*, with its wedge *v* and spring *l*, in combination with the stationary cable *k*, substantially as and for the purpose set forth.

THOMAS SHAW.

Witnesses:

JAMES KEENAN,  
WM. F. BREY.