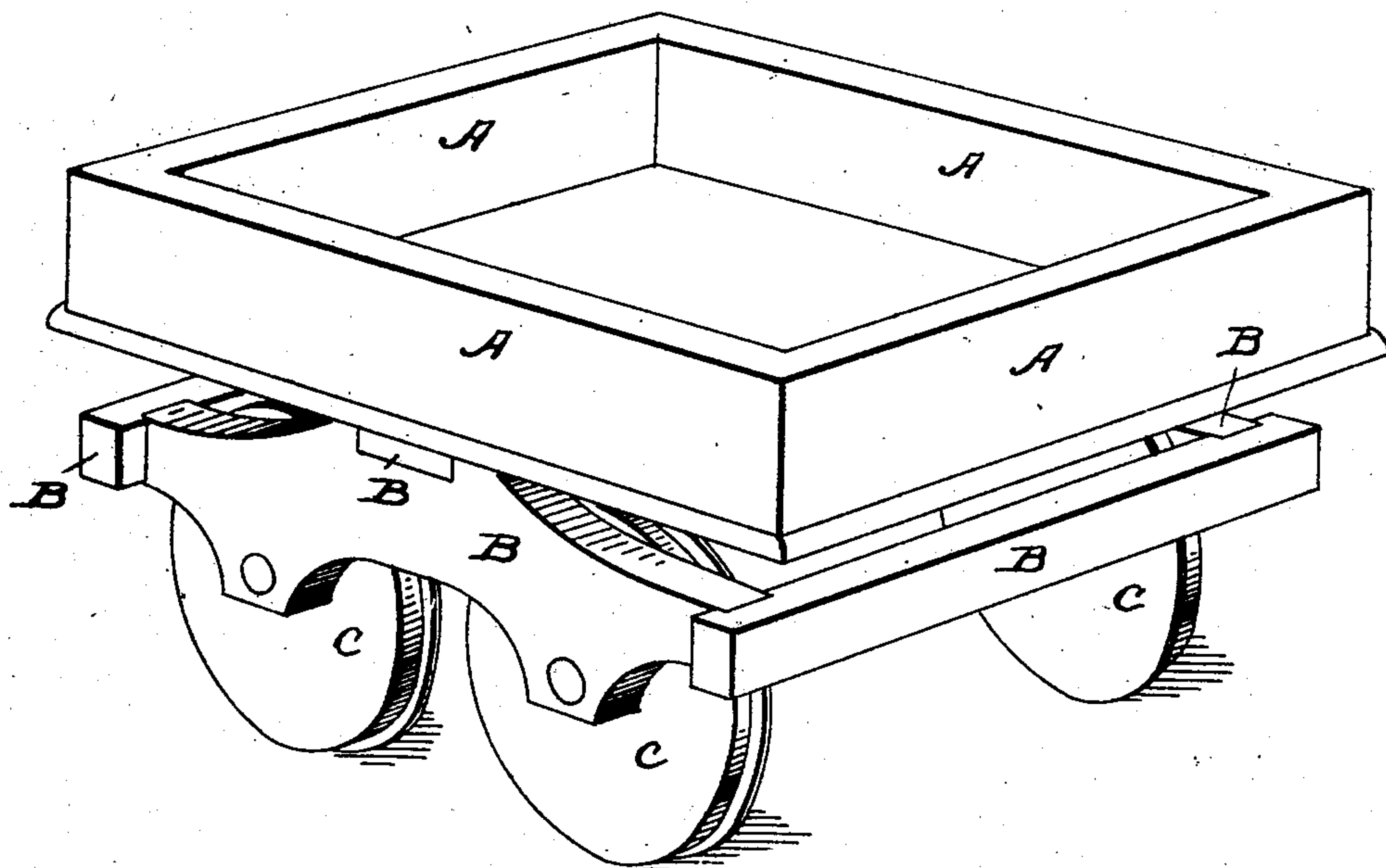


P. H. WATSON.  
RAILWAY CAR.

No. 85,720.

Patented Jan. 5, 1869

*Fig. 1.*



Witnesses:  
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# United States Patent Office.

PETER H. WATSON, OF ASHTABULA, OHIO.

Letters Patent No. 85,720, dated January 5, 1869.

## IMPROVED RAILWAY-CAR

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, PETER H. WATSON, of Ashtabula, in the county of Ashtabula, and State of Ohio, have invented or discovered a new and useful Improvement in Railroad-Cars, for the transportation of persons and property, of which the following is a full and exact description.

The transportation of persons and property on railroads, in cars, as heretofore constructed, mainly of wood, is subject to frequent accidents and hazard of destruction or injury from fire, by reason of the combustible and easily-inflammable nature of the wooden materials of the cars. Explosion of a lamp, overturning of a stove, carelessness in the use of lights, and other casualties, in themselves of little importance, often occasion calamities, loss of life, and loss of or injury to property, by causing the conflagration of cars, which might be avoided but for the inflammable and combustible nature of the wooden materials of their structure.

Railroad-cars constructed wholly of metal are not liable to these disasters, but although long known, and advantageously used for some purposes, such cars have not been extensively used for general traffic, because, for such purposes, they are subject to serious objections.

For general railroad-traffic, cars constructed, except as to their running-gear, chiefly of natural wood or lumber, are generally used, and upon the whole preferred, notwithstanding their liability to conflagration and the disasters mentioned.

A plastic material, composed of sawdust, or vegetable or animal fibre, united by an unflammable cement, has been moulded into suitable shapes, and proposed for the construction of railroad-cars.

This material, although fire-proof, cannot be used for making cars without a sacrifice of the advantages of natural wood, or ordinary lumber, and therefore it has not been adopted for that purpose.

My improvement is designed to preserve all the advantages of the natural wood or lumber commonly employed in the structures of railroad-cars, and to remove or diminish the danger of conflagration, by using in the construction of such cars natural wood or lumber made unflammable, wholly, or in great degree, by impregnating or charging the wood with silicates, or other matter having little or no combustible or inflammable quality, and without otherwise changing the ordinary materials, forms, or dimensions of such cars.

It has long been well known that by charging or impregnating wood with silicate of lime, or other incombustible or unflammable substances, a quality is thereby imparted to wood which makes it non-inflammable, or slow to ignite, and difficult to burn, so that it may successfully resist flame or fire brought into contact with it, that would quickly conflagrate and insure the destruction of wood not thus charged, impregnated, or prepared.

As the processes for preparing silicates and other

materials suitable for charging wood, to lessen its inflammability and combustibility, and the processes for charging or impregnating wood with such non-inflammable substances, are well known in the arts, a full description of them here would render this specification unnecessarily prolix. It is sufficient, for practical purposes, to say that one or more tanks should be provided, of proper dimensions, to receive the long and heavy timbers of a car-frame, and one or more tanks, of proper dimensions, to receive the shorter and lighter pieces of wood required in the construction of a car.

In these tanks the wood should be laid in open order, by inserting narrow strips beneath and between the several pieces, to allow the impregnating-fluid to flow freely around them, as air flows around boards piled in the usual manner to season.

For the purpose of heating its contents, such tank should be provided with a coil of steam-pipes.

A cock should be fitted to these pipes to admit steam into the tank when required.

If it be required to impregnate the wood with great rapidity, strong iron tanks, capable of bearing an internal pressure of about two hundred pounds to the square inch, should be provided, with appropriate devices for charging and discharging the impregnating-fluids, and the wood to be impregnated.

If a slower process should be deemed sufficient, in such cases tanks made of plank have been found to answer a good purpose, as the impregnation may be effected without artificial pressure, by soaking, steeping, and boiling the wood in the liquids a longer time.

After piling in a tank, as described, the wood to be treated, and securing it from floating, by clamps or other suitable means, a quantity of silicate of soda, or other anti-combustible substance, in a state of fluidity, (a solution of silicate of soda in water being preferred,) should be poured into the tank until the wood to be impregnated or charged is covered.

The silicate solution may be prepared by taking strong silicate of soda, in the usual form of sirup, one part by measure, and two like parts of soft water, and stirring them together until well mixed. This solution should be immediately poured into the tank, to charge or impregnate the wood.

If, before pouring the silicate solution into the tank, the wood in the tank should be steamed until its temperature, throughout its whole mass, reached 212° Fahrenheit, and while thus hot, the wood should suddenly be flooded with the silicate solution, the impregnation would be much accelerated. The wood should not be left to soak or steep in the silicate solution until it is too deeply penetrated.

The wood for the frame, and for those parts of the car not liable to exposure to flame, or to greater heat than scattering sparks produce, would, in general, be sufficiently protected by the penetration of the silicate solution to the depth of one-twentieth of an inch



while the wood for those parts of the car more exposed to flame or fire, may be saturated from two to six times that depth, according to the degree of exposure to which it is liable.

The penetration of the silicate will be more or less rapid, according to the kinds of wood and the condition of the impregnating-material used, but its depth can readily be ascertained by an examination, from time to time, of test-blocks of wood of the same kinds and thickness as those undergoing impregnation, and placed in the tank at the same time, and subjected, in all respects, to the same treatment.

After the wood has been thus charged or penetrated with the fluid silicate, the solution should be drawn out of the tank, and the wood partially dried, by exposure to the air, or, if that is not quick enough, by steam-heat.

After being thus about half dried, a strong solution of chloride of calcium, or chloride of lime, in water, should be poured into the tank, in quantity sufficient to cover the wood. Heat should then be applied, by means of the steam-pipes, to boil the solution, after which the heat may be withdrawn, and the contents of the tank allowed to cool.

The calcium-chloride, by this process, will penetrate the wood, and coming into contact with the soda-silicate, these compounds will mutually decompose, and the lime of one will combine with the silica of the other to form silicate of lime, leaving the chlorine and soda to unite, and form chloride of sodium, or common salt.

The lime-silicate being a flinty, and practically insoluble compound, remains in the wood, filling its pores, and encasing its fibres, while the salt is easily soluble in water, and can be dissolved and washed out.

Test-blocks can, as in the case of charging the wood with the silicate, be examined from time to time, to ascertain when the boiling has been continued long enough to cause the chloride-solution to decompose the soda-solution.

The next step in the process is to withdraw the chloride-of-calcium solution from the tank, and then to fill the tank with water, to dissolve out the salt. The water of the tank should, after a few minutes, be run out, and the tank refilled with fresh water, which, after a longer time, should, in turn, be run off, and the tank again refilled, and heat applied until it boils.

The examination of test-blocks, as before, will show when the salt is dissolved out of the wood, at which time the heat should be shut off, the water withdrawn, and the wood taken out of the tank and dried, when it will be ready for use in the construction of cars.

If, in drying the impregnated wood, there should be danger of season-checking, it may be guarded against by applying glue, sizing, or other suitable covering, to the ends of the pieces.

The wood may be cut into the proper dimensions for the several parts of a car, before impregnation, and these parts may severally be dressed and fitted together preparatory to impregnation. Or if, in any case, it should be found more convenient to put together certain parts of a car, as doors, sash-frames, seat-frames, panel-work, or other parts, preparatory to impregnation, it would only be necessary to vary, in a corresponding manner, the dimensions of the tanks and other means and appliances, to adapt them to the sizes and forms of the parts to be treated.

In like manner the whole body of a car might be impregnated after having first been constructed of unprotected wood, by dipping its sides alternately, or immersing it bodily in a tank of the impregnating-fluids. When such modes of applying impregnating-fluids are inconvenient, the wood-work to be fire-proofed might be charged with the fluids by washing, or other convenient and well-known modes of applying such fluids to and incorporating them with the surfaces of wood-work. The result aimed at being to fire-proof the wood-work of cars, to protect it against conflagration, it is immaterial, so far as this result is concerned, whether

the fire-proofing be accomplished before the wooden materials are dressed or fitted, or after; or after they have been partially put together or after they have been dressed, fitted, and built into cars; hence, this improvement is applicable to existing cars, as well as to such as may be constructed hereafter.

It is necessary, in the case of old cars, preparatory to fire-proofing their wooden material, to remove paint, varnish, grease, and other covering-matter from the wood-work by scraping, washing with water, naphtha, alkaline solutions, or other equivalent means of cleansing the wood, so as to permit the free penetration of the fire-proofing fluids.

To guard against impairing the strength of their frame-timbers, upon which the strength of cars greatly depends, by the chemical or mechanical action, upon the fibres of the wood, of the salts employed in the fire-proofing solutions, these frame-timbers should not be penetrated throughout their whole mass by the fire-proofing materials, nor more deeply than required for their protection against fire, which, in most cases, would be accomplished by incorporating the silicate with a thin outer layer or crust of these parts, the frame-timbers being least exposed of any part of the car to immediate danger of combustion.

I have described one process, among many that are well known in the arts, for impregnating or charging wood with fire-proofing materials, and have shown in what manner it may be applied in the construction of railroad-cars, for the better protection of persons and property transported therein from danger of conflagration.

Others of such known processes, with their appropriate materials, apparatus, and manipulation, may be employed in some cases with good effect. Such variations, however, are mere questions of practice, and must be left to the judgment of constructors, as my improvement is not dependent upon or confined to any special kind of impregnating-material, or process for the application of such material, so that substantially the same result be attained by substantially the mode of operation herein pointed out.

The annexed drawing represents an ordinary railway freight-car, in which the box A and the frames B of the trucks are made of wood, fastened with metal. The wheels C, with their axles, journal-boxes, the springs, and other parts of the running gear, are made of metal. These parts are all constructed of the usual form and dimensions, but the wooden materials are charged or impregnated with silicate of lime, for protection against taking fire, and thereby making the transportation of combustible property, by means of such a car, safer against injury or loss by fire.

My fire-proof improvement applies to railroad-cars, for all purposes in the construction of which ordinary lumber, *i. e.*, timber sawed into scantling and boards is used.

Cars constructed upon my improved plan have all the useful properties of ordinary wooden cars, and have, in addition, the advantage of being little if at all liable to be ignited by sparks, the upsetting of a lantern or a stove; but if, from any cause, they should be ignited, they would not readily flame and burn goods or passengers; and, in the event of any part of the wood-work being heated by contact with a burning body, it would only slowly char, and, on the removal of such burning body, would soon cease to burn, by reason of its having been enabled, as already described, to resist active combustion.

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

The said improved fire-resisting railroad-car, with its body made of wood, for the better protection of persons and property in transit, substantially as herein described.

P. H. WATSON.

Witnesses:

C. BOOTH,

L. A. TYNCH.