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Improvement in Setting Blocks for Saw Mills.

Fig. 1 of the accompanying engravings presents a perspective view of an improved device for setting logs to be sawed to any required thickness. The setting frame, it will be seen, is not in proportion to the carriage and frame, as the representation was taken from a model; practical sawyers will, however, readily understand the operation of the device. Fig. 2 is a top plan of the setting device.

The machine is driven by a belt on the pulley, A, on the same shaft of which is another pulley, driving by the belt, B, a loose pulley, C, the hub of which is a clutch engaging with a similar clutch forming part of the pinion, D. A lever, E, serves to ship the gear and clutch, D, from contact with the gear, F, and pulley, C, when the machine is to be operated by hand. A belt from the pulley, G, the shaft of which carries the gear, F, drives the pulley, H, Fig. 1, and this, by means of the gear, I, same figure, turns the screws that move the head blocks, J, the two screws being connected by pulleys and belt as seen in both figures. The connection between the driving power and the movable heads is thus sufficiently explained; the automatic setting of the log is assured by the device to be described.

On the shaft that carries the pulley, G, is an index plate, K, perforated with holes, and having a toothed or serrated edge. In the holes fits a pin passing through a slot in the spring, L. A pawl lever, M, held to the periphery of the index wheel, K, by a spring, engages with the ratchet teeth on the disk. Attached to the disk or index is a cam, N, seen in Fig. 2, that operates an arm, O, secured to the shaft on which are the wheels, D and C, and moves the clutch on the same shaft to disconnect it with the pulley, C, which is held in place by the guide, P, Fig. 2.

The holes in the disk are numbered, and spaced to correspond with the pitch—four to the inch—of the screws which move the head-blocks, J. Of course the gears, D and F, have teeth, in number conforming to regular proportions, those in the first being just half as many as those in the latter. Consequently, for every turn of the screws, the wheel, D, makes two revolutions, while the gear, F, makes one. By these means unfailing accuracy is secured.

When any given thickness of lumber is required, the pin in the spring, L, is set in that hole in the index numbered to correspond to half the number of revolutions of the pinion, D. If, for example, ten revolutions are required to move the log the distance desired, the pin is set in the hole numbered five. The two halves of the clutch are then engaged, and the machine put in motion, when a little dog on the shaft, carrying the arm, O, successively, moves one tooth after another with each revolution of the shaft, and the movement being completed, the cam, N, engages with the arm, O, and instantly disconnects the clutch, and stops the transverse motion of the log. Then, by drawing back the pawl lever, M, the index is thrown back to its starting point by means of a coiled spring, and engaging bar on its face—seen in Fig. 1. When only half a turn is desired, the pin is set in one of the inner circle of holes in the index

The inventor claims, that with this machine the work can be done quicker and better than by hand, that the device sets the log always accurately, and its use dispenses with the labor of one man or boy. It can be changed instantly, while the machine is running, from one grade or thickness of lumber to another. Lumber sawed by a machine provided with this attachment is much more even in thickness than that which is sawed on the ordinary mill where the stock is fed to the saw by hand. The patentee will sell the right for the Eastern States. The letters patent, dated Sept. 17, 1867, were procured through the Scientific American Patent Agency by Titus Whitmore, Dubuque, Iowa, whom address for further information.

Fig. 1.

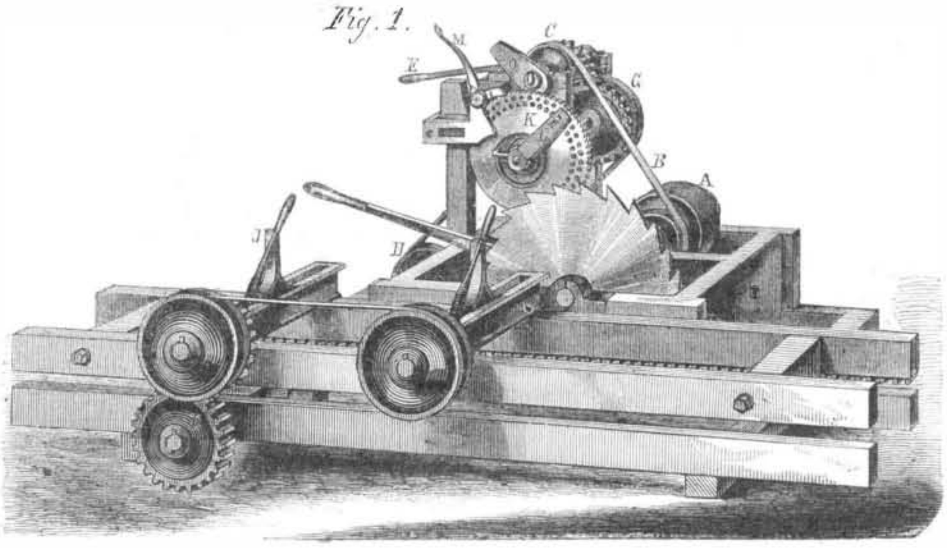
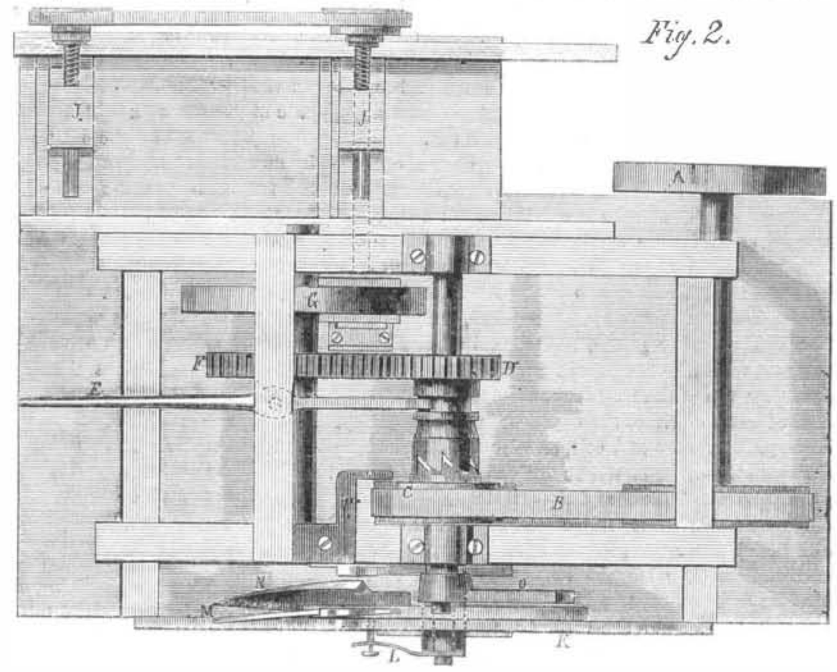


Fig. 2.



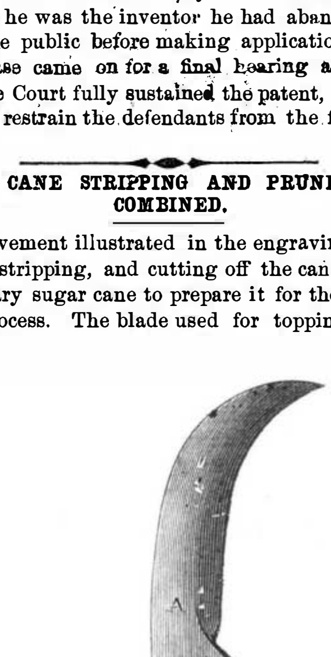
WHITMORE'S PATENT HEAD-BLOCKS.

Important Patent Suit.

A patent case of great importance to stave manufacturers has recently been decided in the United States Circuit Court for the western district of Michigan. This was a suit in chancery between parties residing at Kalamazoo, for the infringement of a patent for a stave machine, granted to Wm. Sisson, of Fulton, N. Y., on the 24th of Sept., 1861, under which the complainants claimed. The defense denied that the improvement was invented by Wm. Sisson, and also alleged that if he was the inventor he had abandoned the invention to the public before making application for his patent. The case came on for a final hearing at the October term, and the Court fully sustained the patent, and issued an injunction to restrain the defendants from the further use of the machine.

BARLEY'S CANE STRIPPING AND PRUNING KNIFE COMBINED.

The improvement illustrated in the engraving is intended for topping, stripping, and cutting off the cane of sorghum or the ordinary sugar cane to prepare it for the grinding or squeezing process. The blade used for topping the cane is



curved as at A, similar to the blade of a pruning knife. Its back at the rear end next the handle is formed into a curved edged jaw, in connection with which the spring jaw, B, completes a device for stripping the cane of its leaves.

In operation, after topping the cane with the blade, A, a pressure of the index finger on the spring, C, opens the jaw, B, to receive the cane, when the tension of the spring, C, will grasp the stalk, and a downward motion of the hand holding the stripping knife cleans off the leaf blades, and a drawing motion toward the operator will cut the cane off at any required point. By removing the spring and blade, B and, C the implement becomes an efficient pruning knife. The dotted lines show the position of the spring blade when brought up to receive the cane. This blade with its spring is attached by a nut and screw or some other suitable device to the end of the shank of the knife proper, and is constructed so as to pass freely by the main blade and to have its point engage with the opposite side of the blade, which gives it a firm hold in the act of stripping.

This improvement was patented through the Scientific American Patent Agency, Sept. 24th, 1867, by J. H. Barley, who will reply to all communications addressed to him at Sedalia, Mo. Territorial and manufacturing rights for sale.

PASSENGER TRAVEL ON BRITISH RAILWAYS.

From the columns of an exchange we transfer the following interesting correspondence respecting English railways as compared with those of our own country. The rolling stock on the English roads when contrasted with that found on American railways at first strikes the stranger unfavorably. The locomotive without polish, painted with a dull, gray, stone paint, illustrates the contempt for appearances as to attractiveness in color or model characteristic of English ideas.

"Cars with like dark, dingy color, improved by coal smoke, and ugly baggage railings on top, with some tarpaulin coverings thrown over the unsightly piles of old trunks and furniture, make up even the first-class trains. Coal is burned in these locomotives, in furnaces at the rear within the exterior circle of the tubular boiler, the heat being conducted through the boiler by a multitude of small tubes terminating in front, in a common air or smoke chamber, from which a funnel or flue, about twelve inches in diameter, with a top shaped like an inverted bell, rises perpendicular about three feet above the top of the boiler. Of course they need no spark arresters, and seem to require less draft in running their fires than ordinary wood engines.

"These engines are scarcely two-thirds as high as locomotives on American roads. It seems to be a desideratum to place the weight of the machine and the water of its boiler, as near the track as can be done, and still leave the necessary space for its wheels and machinery. The cars are about twenty-five feet in length, and run on double trucks like ours, but on two pairs of wheels to each car, with a shaft passing through a frame on which the car body rests, with intervening springs. The wheels are not as large or so heavy as those used on American roads, bringing the body of the cars some eight to ten inches nearer the track.

"Each car is divided into three compartments or carriages,' each carriage with two seats across the car, facing each other —the entrance being on the side, between the seats. Each seat will accommodate three first-class passengers, or four second or third-class. The interiors of the first-class carriages are luxuriously upholstered, the seats being finished as easy chairs with side arms, so that the seats occupy the width of the car, and eighteen sittings will fill an entire car. The second-class cars or carriages, for first, second and third-class carriages or compartments, are sometimes found in the same car, and are furnished with cushioned seats and cushions for the back, but have no divisions into separate seats, so that eight passengers can sit quite comfortably in each carriage, or 24 in each car when full. Third-class cars have either plain board seats, or in some cars, none at all.

"The gage of English railways is four feet, eight and one half inches, and while cars on American roads have a projection of over a foot on each side beyond the track, the English cars project only from six to eight inches, not measuring the plank step on each side, extending along the car outside, on which the guard or conductor passes the entire length of the train when necessary, while it is in motion.

"The English cars are much lighter in structure than ours, and by their momentum when in motion have less force against the control of the train by the engineer. It will be seen that these cars have no front or rear platform, but are kept apart from each other by spiral-spring railroad buffers. These consist of a turned iron bolt, about 2½ inches in diameter, around which is a coiled steel spring. The bolts and the coiled spring around them are inserted in a socket a foot to a foot and a half at each end of the lower side timbers of the cars, making four buffers to each car, projecting some six or eight inches beyond their sockets in the end of the timbers, and presenting a disk in the form of a bolt head toward the next car in the train some eight inches in diameter, with a wood face sunk in a circular case of iron. As the train slackens speed these disks come in contact and force back the bolts bearing them into their sockets, compressing the spiral springs surrounding the bolts within their sockets and so relieving, to a considerable extent, the force of the concussion. The lightness of the cars produces much less force in the concussion, even when the train slackens from a high rate of speed, than do the heavy cars on our roads.

"The trains have a single screw brake, operated by one brakeman inside a compartment of one of the cars fitted for the purpose. The brake is controlled by an effective power of a screw and leverage combination that answers quickly and effectively the movements of the machine. In this way two brakeman to a train, or one if the route to be run is short, do the work of from three to half a dozen, on our express trains. The conductor or guard, as he is called, has his seat in the rear car, with a compartment sometimes elevated a foot or so above the top of the train, so that he can see the entire length of the train and direct the engineer in any exigency. This is done not by a rope and bell, as with us, but the guard has a shrill metal whistle, whose various sounds are well understood between himself and the engineer.

"Most American travelers have a dread of danger by fire or otherwise, while traveling on such trains, without means of communicating with the engineer or guard. They have a kind of notion that if a kerosene lamp, which is usually let down in the top of the carriage, to light them by night or through tunnels, should explode, they would be considerably suffocated or scorched before communication could be had to stop the trains and facilitate their escape. On the trains from London to distant principal towns, a second guard, who has charge of the baggage, usually goes through. His office answers to that of baggage master with us; though he is of the same grade and authority in running trains as the captain of the train, in case it is put into his hands or the captain should be sick. Hence, the long-travel English trains have two competent guards or conductors, two brakemen, a fireman and engineer, with casual supernumeraries as porters and the like passing over the road. Next to the police, I found the guards on the railways the most obliging men in England. Their responsibility ends with the safe conducting of their train to its destination. They collect no fare by the way, and run their trains by the instructions of the head railway officer of the company in London.

"At the head office, and at the depots along the route, are a class of railway officials called 'booking agents' and porters. Half of these officials either fill sinecures or are employed in red tape details which add nothing to the income of the company. Two ticket agents at depots within our large cities, and the station agent at each intermediate station, are found amply sufficient to conduct the sale of tickets on our most traveled roads. But in Great Britain, first-class, second-class, and third-class tickets must each have a separate agent for their sale at most of the stations, and where night as well as day trains are run, a double number of these officials are usually employed. There are also nearly as many porters as booking agents, thus illustrating the proverb, that 'where the carcass is there will the buzzards be gathered together.'

"The 'luggage vans,' as they are called, are not provided in sufficient size and numbers to accommodate travel on the great thoroughfares, and this custom of loading the tops of the passenger cars has sprung up to meet the exigency. Since I am on the subject of baggage, I may as well note here that all responsibility as to the safe transportation and delivery of baggage by British railroads, is avoided as far as possible. Their system, or rather lack of system, is most villainous. The system of checking baggage, as prevailing in this country and on the continent, is entirely excluded, and the responsibilities of the company are limited by acts of Parliament to the narrowest limits. You may see your baggage put into the 'van,' but what railroad employé knows that it is yours? If a confidence man should turn up at your destination, he might carry off your baggage under claim of ownership, and you have no check by which you can identify your luggage or repel the theft. The English custom in this department seems to make the baggage say to every wander ing loafer, 'come and steal me.'

"The English railways are constructed at a greater expense per mile than those in America. The road beds are better prepared for their superstructures, rails are laid with more uniform and even supports, and the joints of the rails, while sufficient allowance is made for contraction and expansion by heat and cold, are so fished as to present a uniform surface to the wheels of the cars, so that little motion or jolting of the cars is felt by the passengers, and traveling is far less fatiguing than on our roads. On most of the lines the expense of construction is greatly increased by tunnelling and excavations to avoid curves or ascents and descents in the structure. Of course, the tunnels have to be protected by heavy masonry, and the excavations are sloped down from the surface of the ground at an angle of some 45 degrees, the slope being neatly sodded or cultivated with grass, flowers or grain, by the station men along the road. Then the stations are stone structures, erected at great expense; in many instances far beyond the necessities of the business of the roads. Every crossing of the track by highways is either tunneled under the road or bridged over it, as we stated, and at all stations are foot bridges over the road, which passengers and others who have occasion to cross the track must take, as it is a misdemeanor to cross the track otherwise, except by the employés of the road.

"The speed on English railroads varies from twenty to fifty miles an hour, according to the condition of different roads and the exigencies affecting the business interests. On the whole, their speed is about one third greater than that of trains on our own roads.

"I have stated that the rolling stock is much lighter than ours; and ordinary freight cars are limited to five tuns burthen by law, or by a legal inspection required by statute. They are mostly flats, relying upon tarpaulin coverings to protect the goods transported from wet weather.

"The fares on these railways are nearly double the fares on our own. The cost of transportation is considerably increased by the English system of caste or classes of passengers. They must go prepared to carry first, second and third-class passengers, while however over-crowded the cars of some of these classes may be, no one must set foot in the car of another class, though half a dozen cars of such class may be running vacant over the road. Hence the transportation of vacant cars is a wasting expense to almost every train run. This division of classes in passengers renders a much larger number of trains each day necessary to do the business of the road. No less than five trains stopped at Stafford on their way to Rugby and London. All were to pass over the same road within an hour of time from the earliest to the latest of the five. If there had been no classes with the passengers, three of these trains would have accommodated all the passengers, and the expense of running two of them would have been saved."

Omnibus Subways.

Mr. Peter Barlow has published the prospectus of a scheme which, if we could take his word for it, would revolutionize railway engineering—dispensing with steam, and, indeed, nearly all other power, and reducing wear and tear to almost next to nothing. He proposes to drive a system of tubular subways under London—first of all under the Thames, near the Tower, and to work carriages through them, each weighing two tuns, loaded, and containing twelve passengers, the motive power to be that of *one man!* Mr. Barlow estimates the friction of his omnibus, running on a very accurately laid railway, as four pound only per tun, and the resistance of the air at two pound more, or six pound per tun in all, or twelve pound only for the loaded carriage! He proposes to make the quarter-mile run of the Tower subway in 2½ minutes, or at the rate of six miles only an hour. With "two and half men," however, which means, we suppose, two men and a boy, the run can, he says, be made in one minute, or at the rate of fifteen miles an hour, which is more like what the public would require.

Of course, if safe railway carriages can be made to weigh no more than the weight of the passengers carried—the present ratio being as from three to five tuns of carriage to one tun of passengers, and if the resistance to motion may be diminished to but from four pounds to six pounds per tun, Mr. Barlow's scheme may answer; but so, of course, a reform could be made in all our ordinary railways, which would save something like eight millions yearly in their working expenses, equal to 2 per cent additional dividend upon the £400,000,000 invested in British railways.

Mr. Barlow proposes to drive his cast-iron tubes horizontally through the soil by means of powerful hydraulic pressure; and between stopping-places (for he dispenses with stations) he proposes to let the line descend for half way, and then rise again, so as to help the carriage off on starting, and help also to bring it up without brakes in stopping. The passengers are to be lowered to and lifted from the tubes by hydraulic lifts.

The plan reminds us somewhat of the proposition printed a few years ago by a shareholder in the Great Western Company, who insisted that the trains on the branches of the company's lines might be worked each by a horse, mounted on an endless railway in the guard's van, and who would thus work the train at ten miles an hour, while, "if whipped up," the poor brute would "easily" do twenty!—*Engineering.*

NEW LETTER ENVELOPE.—An English patent has been granted for an improved adhesive envelope named the Camden Envelope. The gum is placed upon the lower fold instead of the flap, so that the tongue comes in contact with clean paper when the flap is wetted to secure the envelope. The general form of the envelope is admirably adapted for the protection of the contents. Those who write many letters will appreciate an invention which does away with the disagreeable task of licking a gummed surface.

A FLOURISHING VINE.—In Santa Barbara, California, is a grape vine planted forty years ago, and which now measures, at four feet from the ground, three feet around it. At the hight of six feet it branches out, and the branches, which are supported by scaffoldings, spread over an area of from 1,000 to 1,200 feet. The annual crop from this vine averages four tuns, and has at some seasons exceeded 12,000 pounds.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

For the Scientific American.

ON SNOW, RAIN, AND HAIL, IN THEIR RELATIONS TO THE ATMOSPHERE.

The condensed moisture of the air is never pure water (H O) alone, as it is generally supposed, it even presents in its composition the same if not a greater variety than the springs flowing from the interior of the earth. This is easily understood when we consider that the elastic fluid which envelops the earth in an aerial ocean is not simply a mixture of nitrogen and oxygen and a small amount of carbonic acid, but also contains though in small quantities, a great many other substances, which are readily absorbed by the descending precipitates, and as the atmosphere itself is modified in its condition according to adjacent circumstances, so also the condensed moisture, which we perceive in the form of snow, rain, or hail. Though the amount of foreign substances in the air may often almost be infinitesimal, they are not always to be considered as altogether insignificant.

Nitrogen and oxygen are not met with in the same proportions in the many forms which moisture assumes, there being about one-fifth less of the former, one-third more of the latter, with still a greater proportion of carbonic acid contained in them as contrasted with dry atmospheric air.

The combustion of fuel and the continual cremecaresis (slow decay) of organic matter occurring on the surface of the globe is the origin of the presence of ammonia in atmospheric moisture. It is met with in both the free and combined state, in the latter with nitric or carbonic acid. Nitric acid is known to be formed by electrical discharges, the nitrogen of the air combining directly with its oxygen. Nitrate of ammonia is therefore constantly to be met with in rain during and after thunder storms. Boussingault even claims to have found it always in the rain, though in very minute quantities. Its amount is, however, almost always not observable a very great time after the storm has ceased, but the converse has been found to be true of a fine shower.

In snow and hail more ammonia is present than in rain, probably owing to the greater cold in which they are formed, ammonia being more readily absorbed by cold than by heat. Rain falling after a dry season abounds with ammonia, often containing six milligrams to the liter (1 milligram=0·0154 grains; 1 liter=1·0567 wine measures), this not being the case with the rain of a rainy period. Nitric acid is, as we have mentioned already, found in combination with ammonia, but only in its free state, during heavy thunder storms, when the rain will sometimes redden blue litmus paper. The average quantity of nitric acid in rain water is stated to be one-millionth part of its entire bulk. Snow has been found to contain more nitric acid than rain, and hail more than rain.

Traces of sulphuric acid have been discovered in the rain of London and Manchester, and Dr. August Smith is accounting for its presence, which doubtless finds its explanation in the sulphurous vapors produced by the combustion of coal, with the rapid disintegration of buildings in those cities. Sulphuric acid has been detected in larger proportions in the rain of Manchester than in that of London; though London is the greatest city of the world, Manchester is the largest manufacturing town and the center of a manufacturing district comprehending many hundred square miles; hence we must not be surprised to find the products of combustion existing in a larger proportion in the latter than in the former city.

The atmospheric air is also most generally impregnated with the saline products arising from sea water. Near the coast salt is found to be present in rain water to the amount of seven parts to the million, but less then half that proportion some hundred miles in the interior. The French chemist, Barral, calculates that near Paris forty pounds of salt are yearly descending in the rain on one hectare of land (1 hectare =2·471 acres), and according to Chatin the rain water in Paris during the prevalence of westerly gales is even more impregnated with salt than is the water of the Seine. Snow and hail always contain less salt, as they are formed in more elevated regions.

Chatin also holds that iodine is present in all atmospheric precipitates, which assertion, however, is contradicted by most investigators, they attributing its supposed presence to the impure reagents employed in its detection.

Sulphuretic hydrogen has been observed in the atmospheric precipitates of some parts of the western coast of Africa, where the rivers which empty into the sea abound in decaying organic matter, and phosphoric acid has been detected by Wiegmann in noxious fogs and mists.

Organic substances of an unknown nature are often found in atmospheric precipitates, but Boussingault claims to have discovered marsh gas in the rain of miasmatic sections to the amount of 0·0017 per cent, and Ehrenberg describes the inky rain falling on the 14th of April, 1849, in Ireland over an area of 700 English square miles as putrescent vegetable organism, probably brought there by passing winds.

Non-volatile substances, as meteoric, volcanic, and ordinary dust have often been found in rain, snow, and hail, but they are not of general occurrence. "Photo-chemical analysis," that recent and wonderful discovery, will surely reveal to us many other natural wonders occurring in atmospheric air.

The Hoosac Tunnel Drills.

MESSRS. EDITORS:—I noticed in your paper a short time ago a short account of the Hoosac Tunnel and drills, and credited them to Mr. Burleigh, of Fitchburg. I would merely say that I am the original inventor of the Hoosac Tunnel