

**AN IMPROVED PNEUMATIC RAILWAY SYSTEM.**

The accompanying illustration represents a pneumatic railway system, patented by Mr. George W. King, designed to provide, by simple and efficient devices, a continuous air current to the motor on the car body, without leakage, and without friction or pressure on the valves, while requiring no radical changes in the permanent way. Fig. 2 is a longitudinal section of a portion of the air tube or conduit, Figs. 3 and 4 being cross sections, while Fig. 1 represents the application of the system on a street railway. The underground conduit is indicated at A in Fig. 2, and it has a continuous slot over which fold flap valves riveted to the edges of the slot, as shown at G in Fig. 3. The piston, B, consists of a tube of slightly less diameter than the air tube, and on its outer edges are packing rings, F, making a close joint between the tubes A and B, while the upper face of the piston has a central depression serving as a recess for the ends of the valves when they are depressed. A hollow connecting shank, C, is rigidly secured to the piston in this depression, the upper end of the shank being connected with any suitably constructed motor on the car body. The shank is elliptical in horizontal section, its ends serving as openers or spreaders as they pass along in the slot of the tube, making continual communication between the tube and the motor. To gradually open the flaps as the air-connecting shank passes along, the lower longitudinal faces of the latter are provided with horizontal cams having curved under faces, whereby, as the shank passes along the air tube, communication will be had between the atmospheric air and the air in the pocket or chamber formed between the piston B and the tube A, and so much of the valves as is necessary to be spread apart will be relieved of air pressure, thus reducing the frictional wear on the valves to a minimum. To effect such communication with the outer air, the shank, C, is provided with short vertical air channels, D, the upper ends of which open out above the conduit, while their lower ends open into the space, E, below the flap valves when in their lowermost opened position, whereby any compressed air in the pocket between the cylinders will escape. It is claimed that the cost of construction and maintenance under this system will be low, the cars carrying no unnecessary weight, and there being small loss of power by friction, while it is unaccompanied by noise, and the cars can be started and stopped without jerking. The necessary bells, gongs, brakes, etc., may all be worked automatically by the compressed air, which may also, after use in the motor, be utilized to assist ventilation when this is deemed desirable.

For further information relative to this invention address the patentee, No. 1251 High Street, West, Washington, D. C.

**The Odor of Musty Volumes.**

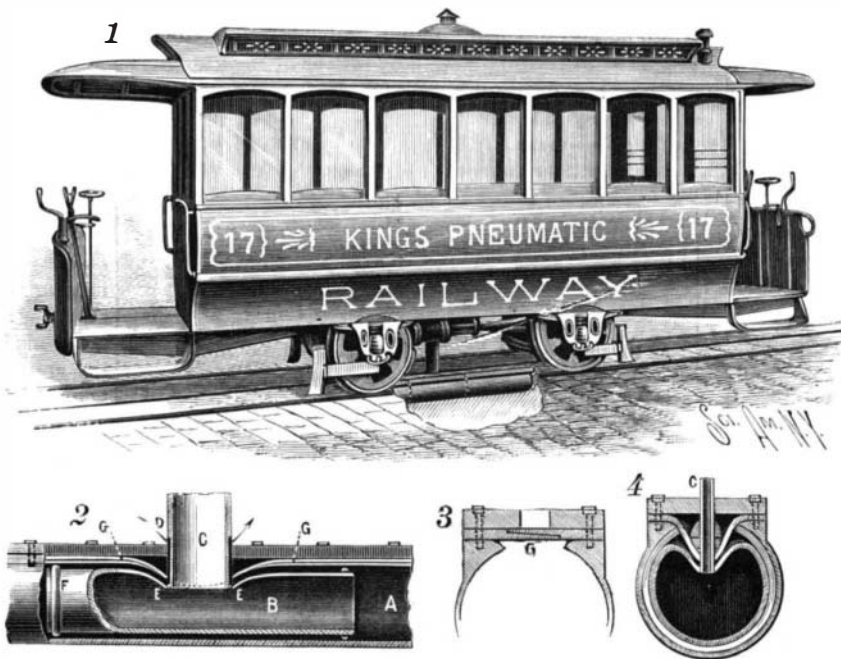
One of the assistants of the British Museum tells me that visitors to that institution frequently have a hard time getting "acclimated" to the place. An hour spent in the rooms invariably gives the visitor (for the first time) a headache. Sometimes it is only after repeated visits that one is able to indulge his researches without carrying away a headache with him. Women seem particularly sensitive to this curious malady, which is said to arise from the peculiar odor created by the storage of so many books. You can get some idea of what this odor is by going to your bookcase, that has been closed for twenty-four hours, and opening one of the doors; immediately your olfactories will be greeted by the mustiest fragrance imaginable. Bibliomaniacs profess to love this odor, and many declare that they cannot value a book unless it has about it that unmistakable and ineradicable smell which infects a volume when once it has crossed the sea in the hold of a vessel.

William Blades, on the other hand, says that the musty smell betokens the decay of a book, and he cries

out against all bookcases which are tightly closed. It is his theory that books require pure, dry air constantly, and the result of his experiments and experience seems to be that the most healthful kind of bookcase is one that has lattice doors, behind which may be hung thin curtains to keep out the dust.—*Chicago News.*

**Explosion of a Dynamite Gun.**

At a trial of the Justin dynamite gun, near Rome, New York, on May 27, the gun exploded and hundreds narrowly escaped being killed by the flying pieces. The gun was a 9 inch cannon which had been in use during the late war. The shell that burst the gun weighed 273 pounds without the explosive, which con-

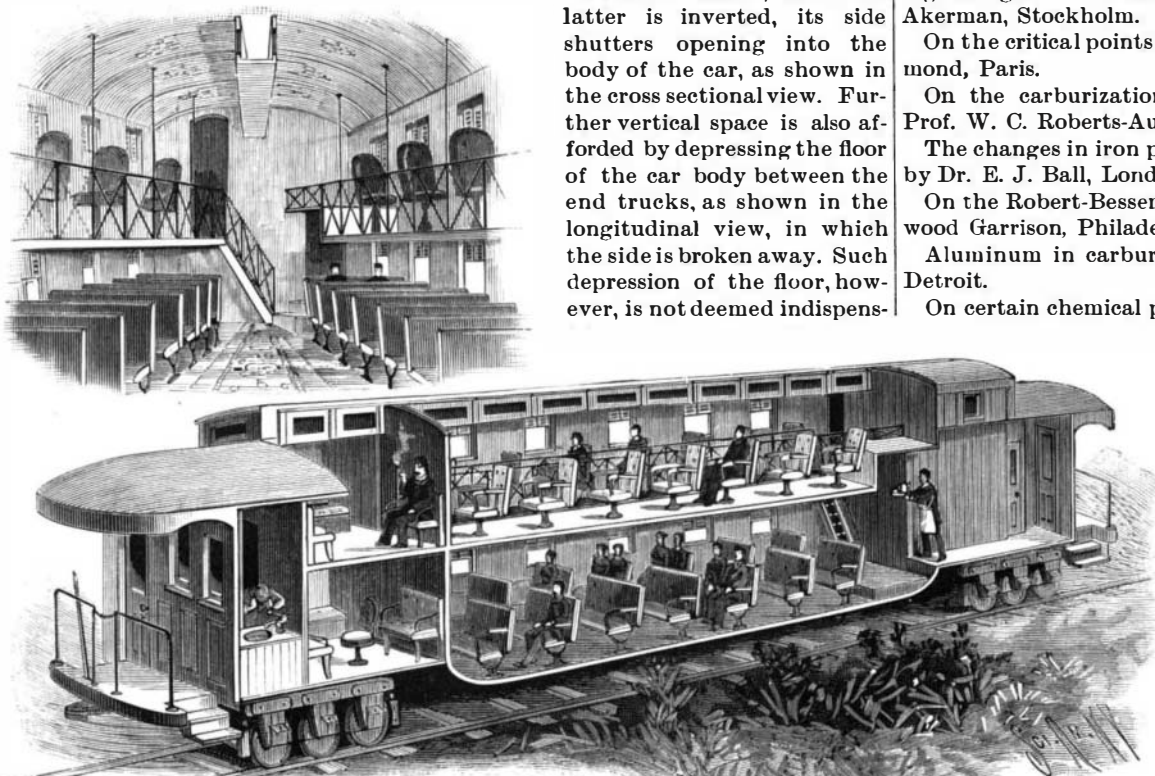


KING'S PNEUMATIC RAILWAY SYSTEM.

sisted of 16½ pounds of dynamite, the shell being 9 inches in diameter and 44 inches long. It had been intended to try the Justin system of projecting dynamite by firing six shells, and large crowds were present to witness the experiment, but the explosion took place in firing the first shell.

**AN IMPROVED PASSENGER CAR.**

The illustration shows a car not exceeding in height the usual drawing room coaches, or at the most only slightly so, so that the bridges and tunnels of the regular railway lines can present no obstacle to its passage, but the construction is such as to provide two floors or tiers of seats, thereby largely increasing the carrying capacity of the car. This is effected mainly by the manner in which the space at present occupied by the car ventilator is made available, the sides of the car roof being carried up to the full height of the usual ventilator section, while the latter is inverted, its side shutters opening into the body of the car, as shown in the cross sectional view. Further vertical space is also afforded by depressing the floor of the car body between the end trucks, as shown in the longitudinal view, in which the side is broken away. Such depression of the floor, however, is not deemed indispens-



HARRIMAN'S PASSENGER CAR.

able, for it will be seen that the central aisle of the car is of full height, permitting ready access to the side seats of the main floor therefrom, while the side galleries above, each accommodating only a single row of chairs, do not extend to the full width of the seats on either side of the aisle below. The car is of the ordinary construction at the ends, except that it has a comfortable smoking and lookout room in the upper part, which

adds greatly to the convenience of passengers. The ventilator is arranged to permit the ready flowing off of water during rain without obstruction to the thorough ventilation of the car at all times.

This car forms the subject of a patent which has been granted to Mr. Orlando Harriman, of No. 43 Wall Street, New York City.

**Unfortunate Bridge Building.**

Another accident occurred at the Louisville and Jeffersonville bridge, May 14, at Pier 4. The working chamber of the caisson had been built, launched, and was in position between two rows of heavy guide piles, tied together at heads, and the crib was being built upon the caisson roof, 13 courses being in position and partly concreted. The river had been rising rapidly, and the current was very strong, and the water about 28 feet deep. The guide piles at the lower end gave way first, and the other side followed; the caisson and crib, thus unsupported, toppled over and carried with it the caulkers and carpenters, and four men lost their lives, among them Charles P. Mitchell, the superintendent for SooySmith & Co. Mr. Mitchell was struck by one of the falling cross braces, and the other men were carried under the caisson and the floats by the swift current and drowned.

The "six" guide piles were 18 inches in diameter, driven 20 feet into the river bed through 28 feet of water, says the *Courier Journal*, of Louisville. The caisson was 25 by 54 feet on the base and was 24 feet high, including the roof. At the time of the accident the top of the caisson proper was 2 feet under water, but the cutting edge was not quite on the river bed. The caisson was suspended at

the four corners by steel wire rope to the cross bracing supported by the guide piles. According to the report of Louis P. Anshutz, one of the caulkers, these cables parted and at the same time the supporting timbers gave way. The caisson itself is said to have turned completely bottom-side up.

**The Iron and Steel Institute will Visit the United States.**

The annual meeting of the Iron and Steel Institute was lately held in the theater of the Institution of Civil Engineers, London, the president, Sir James Kitson, occupying the chair. The following papers were read:

On a new form of Siemens furnace, arranged to recover waste gases as well as waste heat, by Mr. John Head, London, and M. P. Pouff, Nevers.

Calculations concerning the possibility of regenerating the gas in the new Siemens furnace, by Prof. Akerman, Stockholm.

On the critical points of iron and steel, by M. F. Osmond, Paris.

On the carburization of iron by the diamond, by Prof. W. C. Roberts-Austen, London.

The changes in iron produced by thermal treatment, by Dr. E. J. Ball, London.

On the Robert-Bessemer steel process, by Mr. F. Lynwood Garrison, Philadelphia.

Aluminum in carburated iron, by Mr. W. J. Keep, Detroit.

On certain chemical phenomena in the manufacture of steel, by Mr. W. Galbraith, Chesterfield.

The estimation of phosphorus in the basic Siemens bath, by Mr. W. Galbraith, Chesterfield.

On the Rollet process for producing purified castings, by Mr. A. Rollet, St. Etienne.

"The autumn meeting of the Institute is this year to be held in America. The meeting will be held in New York, and we hear," says *Nature*, "rumors of vast preparations that are being made by the hospitable metallurgists and engineers of the United States to wel-

come their British *confreres*. Members are left to make their own way to New York, but upon landing they become the guests of the American Institute of Mining Engineers. From an outline programme we have seen, it would appear that the only limit to the excursion will be the time at the disposal of members, which, those who know American hospitality best will agree, is sure to be exhausted long before the good nature of their hosts."



**Pails.**

The old process is briefly described: The logs are taken from the river dripping with water, and sawed into sections of the length required. This operation is of course common to some extent in the saw mills, and is probably familiar to the reader. These blocks are then taken to the machine used for cutting the staves, which contains a circular saw, thus causing the staves to possess the curves which can be observed in any common pail or tub. But it is in the dry houses that the marked improvements have been made. The old system which we are describing consists simply of wheeling the staves in their green condition to the brick dry house, where they were dried by a huge furnace from which pipes ran here and there beneath the rooms in which the staves were piled. These apartments had an open floor, that is, the different pieces of flooring were laid one or two inches apart to admit the heat from below. With this system from eight to ten days were consumed in getting the staves properly seasoned for use.

**THE NEW PROCESS.**

All this is changed and improved. The new process which was inaugurated merely on trial works to a charm, and it is the intention of the company to adopt and enlarge it. To begin with, an elevated platform is built about fifty feet in the air, of considerable width, to allow wheelbarrows to pass each other. To this, connected to and run by the main power, are built several elevators. At the foot of the elevators are located the machines for sawing out the staves. The staves are sawed and thrown one by one upon this elevator, and by it carried to the platform and dumped into the wheelbarrows. We must pause before we go further to describe the new dry house. It is known as a "tower kiln," and is built to a height of about fifty feet; 2 x 4s laid on the side are the material used. Of these tower kilns there are but two in the United States, the one at Troy and the one lately built by the Menasha Wooden Ware Company. This tower contains twenty apartments, each with a trap door at the top through which to dump the unseasoned staves. These apartments are filled to the brim by the wheelbarrows, which have in turn been filled by the elevators to the adjoining platform. Now comes the process of drying, which is the main advantage of the vast improvement, as it does not necessitate the use of fire in immediate connection with the dry house. A huge circular fan of about ten feet in diameter is cooped up in an iron encasement. This fan is so built that in its revolutions it draws in air. Before the aperture to admit this air is running up and down 4,000 feet of heated inch pipe that is heated by steam from an engine in connection. The heated air thus drawn in by the fan is forced by the same power in under and up into the dry house, the floors of which are iron with numerous holes through them to admit the heat. The time occupied to properly season the staves for use by this new method is from three to six days, or about one-half that occupied by the old. No fire is thus brought into the immediate vicinity of the dry house, and the ease with which the whole operation is performed is remarkable.—*Coopers' Journal.*

**Stones that will Swim in the Human Eye.**

Eye-stones are really portions of the covering of certain shell fish. They are found at the opening of the shell, and serve to close the entrance when the animal draws itself within. They are of various kinds, but those used as eye-stones are hard, stony bodies, about the size of split peas, one-third to one-sixth of an inch in diameter, a little longer than broad, having one surface plane and the other convex.

When they have been worn by the action of the sea, they are very smooth and shining. Like other shells, they are composed of carbonate of lime. When placed in a weak acid, such as vinegar, a chemical change takes place, carbonate acid gas is given off, and in its escape produces the movements which are popularly supposed to show that the stone is "alive."

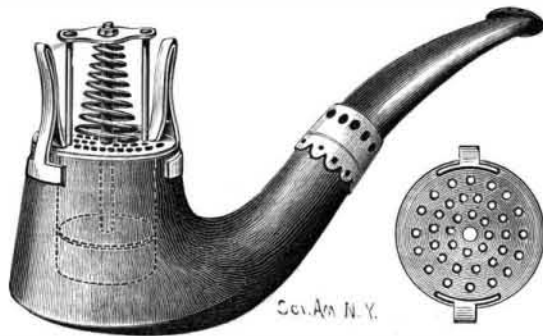
When one of these stones is placed under the eyelid, at the outer corner, the natural movements of the lid in winking push it gradually toward the inner side, and when it comes in contact with the mote which is causing the irritation, this is carried along and finally expelled with it. The belief that such stones have a peculiar detective power, and move about in the eye until they find and remove the irritating substance for which they have been "sent," has no foundation in fact.

It is interesting to know that in the lining membrane of the stomach of the crawfish there are found small bodies which go under the name of "crab's eyes," and look not unlike the true eye-stones. They have sometimes been mistaken for them, and presumably would serve a similar purpose.

The tide tables for the Atlantic coast of the United States, together with 206 stations on the Atlantic coast of British America, for the year 1891, published by the United States Coast and Geodetic Survey, are now ready for issue, and copies can be obtained by addressing the office at Washington. Price twenty-five cents.

**AN IMPROVED TOBACCO PIPE TOP.**

The illustration shows an attachable top or cover for a pipe, by means of which, also, the tobacco may be pressed down into the pipe bowl without removing the cover. It has been patented by Mr. Martin L. Schoch, of New Berlin, Pa. The small figure shows the bottom of the cover, which has numerous perforations, and is provided upon opposite edges with upwardly curved spring arms, doubled over and extending down to clasp the outer edge of the bowl, in such way that the cover may be conveniently attached or removed. A rod having on its lower end a stuffer plate is vertically movable through a hole in the center of the cover, as indicated by the dotted lines, there being a finger piece removably attached to the upper end of the rod. The finger piece has ears at each end adapted to slide upon guides extending upward from the top of the cover, a pyramidal spiral spring being coiled around the rod

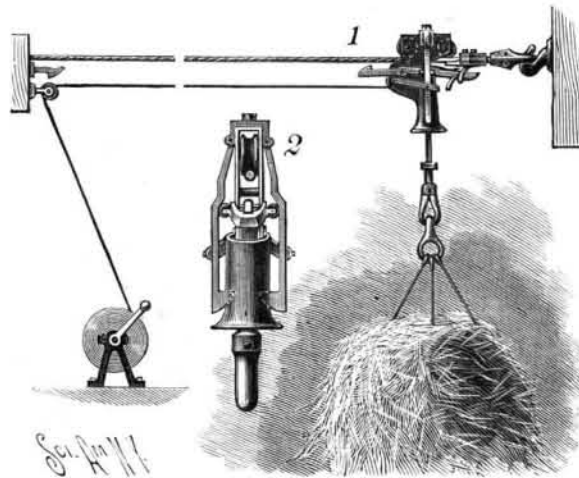
**SCHOCH'S TOBACCO PIPE TOP AND STUFFER.**

between the guide arms, whereby the stuffer plate will be held in elevated position except when it is pressed down to pack the tobacco in the bowl.

**AN IMPROVED HOIST AND CONVEYER.**

The illustration represents a device adapted for use in elevating and transferring heavy substances, carrying the load horizontally to any desired point and lowering it. It has been patented by Mr. Oren W. O'Dell, of Fenton, Mich. Fig. 1 is a side view of the device locked to receive a load, Fig. 2 being a front elevation of the carrier, which consists mainly of a hollow shell, near the top of the upper section of which are journaled two grooved pulleys, while on each side is pivoted the upper end of a spring-actuated arm, which is carried downward and has a latch-head on its lower end.

The latch-heads are normally held within the lower tubular section of the shell by springs. A horizontally-extending centrally-slotted latch-lever embraces and is pivoted to the central portion of the shell, and in the forward wall of the slot is pivoted a trip-bar. In the central section of the shell, beneath a spring, which normally retains the latch-lever in contact with the tubular lower section, are two grooved pulleys over which the hoisting rope passes. The hoisting or trip sleeve has a link at its lower end to which the load is

**O'DELL'S HOISTING AND CONVEYING DEVICE.**

attached, above which is a peripheral flange adapted for contact with the latches on the side arms pivoted at the upper end of the carrier. The track-rod employed in connection with the device is rigidly secured at both ends, where also keepers are located to engage the latches of the horizontal latch-bar. The hoisting rope, attached to the hoisting or trip sleeve, is passed up through the lower tubular section of the carrier, over one grooved pulley and under the other within the carrier, and parallel with and beneath the track-rod, and thence to and over the sheave at the delivery end, to the operating drum. When the hoisting or trip sleeve, with its attached load, is carried upward within the tubular section of the shell, its peripheral flange bears against a trip-rod, by means of which the horizontal latch-lever is disengaged from the keeper and the carrier is free to travel on the track-rod to the delivery point, which is effected by the further winding of the hoisting rope. The other latch of the horizontal latch-lever is then engaged by the keeper, and by such contact the spring arms at the side are pressed outward,

releasing the hoisting or trip sleeve and permitting it to drop to deliver the load.

**The Specification of Letters Patent.**

The late Judge Grier of the United States Supreme Court says:

"There are few things more difficult, even for well educated and practical lawyers, than to describe a new invention clearly, and point out the principle which distinguishes the subject of it from all things known before. As inventors are rarely experts, either in philology or law, it has long been established as a rule that their writings are to be scanned with a good degree of charity.

"But it is easy to abuse this liberality to the purpose of fraud.

"The public has rights to be guarded also, and these exact that the patentee's specification shall set forth his invention so fully and definitely that it cannot be readily misunderstood." (French vs. Rogers, vol. i., Fisher's Patent Cases, p. 138.)

The importance of clearly and correctly describing the use and operation of the invention is well set forth in the opinion of a patent law judge many years ago:

"The intention of the inventor, so as to effect the object designed, is to govern the construction of the language he employs. Inventors are not always educated or scientific men. Some of the most useful inventions have sprung from an illiterate source. Genius is not always blessed with the power of language. Courts look to the manifest design, in order to remove any ambiguity arising from the terms employed. But this ambiguity must not be such as would perplex an ordinary mechanic in the art to which it applies." (Page vs. Ferry, vol. i., Fisher's Patent Cases, p. 298.)

But the comparatively recent words of Judge Miller, now of the Supreme Court of the United States, are like "apples of gold in pictures of silver" to the inventor; they shine out in the inventor's firmament like the bright moon and stars to the lonely people under the splendors of the brilliant arctic night; they contain the most important information and advice to inventors, in words which are, at once, glowing, concise, beautiful and forcible:

"The growth of the patent system in the last quarter of a century in this country has reached a stage in its progress where the variety and magnitude of the interests involved require accuracy, precision, and care in the preparation of all the papers on which the patent is found. It is no longer a scarcely recognized principle struggling for a foothold; but it is an organized system with well-settled rules, supporting itself at once by its utility and by the wealth which it creates and commands. The developed and improved condition of the patent law, and of the principles which govern the exclusive rights conferred by it, leave no excuse for ambiguous language or vague descriptions.

"The public should not be deprived of rights supposed to belong to it, without being clearly told what it is that limits these rights.

"The genius of the inventor, constantly making improvements in existing patents—a process which gives to the patent system its greatest value—should not be restrained, by vague and indefinite descriptions of claims in existing patents, from the salutary and necessary right of improving on that which has already been invented.

"It seems to us that nothing can be more just and fair, both to the patentee and the public, than that the former should understand and correctly describe just what he has invented, and for what he claims a patent." (Merrill vs. Yeomans, vol. xi., Patent Office Gazette, p. 970.)

And the late Judge Grier, after a wide experience in patent legislation, rings out these solemn words of warning:

"The courts always labor to protect a man when they clearly see that he has made a good invention but has got among a set of bungling fellows to draw his patent; and many a time we have had to stretch almost our consciences to help through a good invention against a bad description drawn by some blockhead.

"The difficulty has been that mechanics did not understand law, and lawyers did not understand mechanics."—*The Practical Mechanic.*

**A Warning to Inventors.**

The *Manufacturer and Builder* thinks it does not require much sagacity to take the *Official Gazette* of the Patent Office, which costs \$5 per year, and write letters each week to several hundred patentees throughout the country, telling them you can sell their patent, and then extracting fees by various of the well known methods of swindling; but it does call for an amount of rascality that has hitherto been considered a kind of safeguard or restraining influence in these matters. The plausible letters that can be written throw a large percentage of inventors off their guard, and the scheme must be successful, as it still goes on.

We can do no more than warn all who receive such communications to throw the letters or circulars into the fire.