THE RENO INCLINED ELEVATOR.

The accompanying engraving shows the working of a new style of elevator which is being put to a practical test by the trustees of the Brooklyn Bridge. It is the invention of Mr. Jesse W. Reno, who, by way of introducing it to public and official notice, erected this same machine at Coney Island last September, where it carried over 75,000 people. The present test is being made at the New York end of the bridge, and, as will be seen from the engraving, the elevator is placed to the right of one of the stairways that lead to the station platform. The belt, or movable flooring, has an inclination of 25 degrees, the vertical lift being 7 feet, and it travels at the speed of 80 feet per minute.

Broadly stated, the device is an inclined belt conveyor, similar in its action to those which are used for raising baggage from a steamer's deck to the dock level. It consists of an endless belt, made up of transverse cast iron slats, which are 4 inches wide and 20 inches long, or sufficient to extend across the full width of the elevator. The top surface of the slats is provided with thin projecting parallel ribs, one inch in depth, which are spaced 1¼ inches apart and extend across the full width of the slat. When the slats are linked together to form a continuous belt, these ribs form continuous parallel lines, and as they are dished on their upper edges, they present a good foothold for the passengers. The slats are linked together at their ends, where they are provided with small wheels which roll upon the top flanges of two parallel inclined I beams. The weight of the passengers is thus carried directly by these beams, which serve to keep the flooring in true level. At each end the belt passes over a pair of sprocket wheels, the upper of which is carried on a driving shaft which is operated through worm gearing by the four horse power electric motor shown below the elevator.

Perhaps the most novel and ingenious feature is the provision which is made for connecting the movable with the stationary flooring. This is accomplished by finishing off the stationary floor line with steel comb shaped landings, which will be seen in the engraving at the foot of the elevator. The teeth of the comb project forward and upward between the above-mentioned ribs on the slats just where the belt leaves the lower sprocket wheels. These ribs keep rising between the teeth of the comb and so tend to lift the foot of the passenger and carry him along. As a matter of fact, the passenger naturally takes a step over the comb onto the moving floor. At the top of the elevator the ribs disappear below the comb landing, leaving the foot resting upon the stationary floor. How cleanly this transfer is effected is shown by the fact that a bundle of waste thrown upon the elevator is carried up and deposited upon the top landing.

The present elevator is of single width and is provided with one hand rail, which consists of an endless chain, which is driven by a sprocket wheel on the main driving shaft, at the same speed as the moving floor. It passes over two sprockets placed at a suitable height at each end of the elevator. The chain slides on a flat bar carried on stanchions, and it is kept in place by projecting pins at each link, which slide beneath projecting flanges formed on each side of the bar. A strip of leather covers the chain, and upon this is placed a thick rubber covering, which is riveted to the chain and extends down on each side of it, thus forming a good hand rail.

The capacity of an elevator 20 inches wide is 3,000 persons per hour; and every 20 inches additional width will accommodate another 3,000. It is estimated that ten to twelve feet width would accommodate the 15,000 people per hour that cross the bridge in the busiest hours of travel.

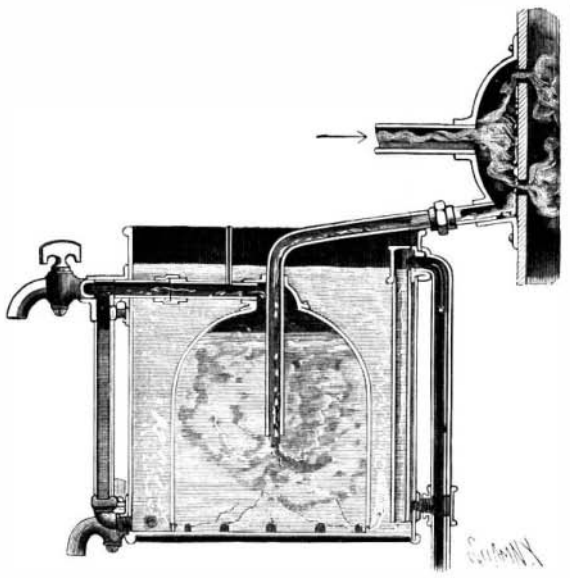
RENO INCLINED ELEVATOR AT THE BROOKLYN BRIDGE.

Nobel's Gift to Science.

A dispatch from Stockholm, dated January 2, states that under the terms of his will the property left by Alfred Nobel, the Swedish engineer and chemist, for a fund for the advancement of science will be realized upon, and the interest on the money will be divided equally into five prizes, to be awarded annually. Three of the prizes will be for the greatest discovery in physics, the greatest discovery in chemistry, and the greatest discovery in physiology or medicine. The fourth prize will be for the most notable literary contribution on physiology or medicine, and the fifth for the greatest achievement for the promotion of peace. The competition for these prizes will be open to the world. It is estimated that the fund will amount to nearly $10,000,000.

A NEW OIL SEPARATOR.

A recently patented device for separating the oil from the water of the exhaust steam of an engine is shown in the accompanying illustration, as it may be used in connection with the heater or condenser ordinarily employed. The exhaust pipe from the engine is tapped



SEPARATING THE OIL AND WATER OF THE EXHAUST.

into an external chamber of the heater, as shown at the right in the engraving, there being upper and lower openings into the heater from the chamber, and a pipe leading from the lower part of the chamber to the separator. The exhaust, striking the outer surface of the heater casing, will be somewhat condensed, and the water of condensation and the oil it contains will pass through the lower pipe to the separator. The latter consists of a flat bottomed tank, in the center of which rests a bottomless cone-shaped can, there being small notches in the lower edge of the wall of the can, affording passageways from its interior to the outside, and by means of an elbow pipe connection, the water of condensation is discharged at about the center of the can. A pipe in which is an upwardly projecting air vent leads from the top of the can to a faucet at the outside of the tank, and the interior of this pipe is connected with a glass gage whose lower end is connected with the interior of the tank near the bottom. Secured within the tank at the opposite side is a vertical, open-ended pipe, whose lower end reaches nearly to the bottom of the tank, and this pipe is connected near its upper end with an elbow pipe leading to a discharge connection. As may be readily seen, the oil in the water of condensation will naturally rise from the point of discharge within the cone-shaped can, more or less filling the top portion of the can, from which it may be drawn off by means of the faucet, while the water will pass downwardly and into the space surrounding the can, rising in the tank and in the pipe at one side until it reaches the level of the discharge connection near the top, the pressure of water within the tank, outside of the can, being always sufficient to force out the oil when the oil delivery faucet is opened. The relative height of the oil and water is always indicated by the gage, and the tank may be at any time emptied by means of a faucet near its bottom.

Vegetarianism—Its Effect Upon Nations.

In a recent communication to the Société d'Ethnographie, in Paris, M. Verrier treated of vegetarianism from the point of view of its moral and intellectual effect upon the nations who, either from choice or necessity, are to be classed as abstainers from animal food. While fully recognizing the dangers of a too abundant meat diet, as well as the advantages of purely vegetable nourishment, the speaker nevertheless felt constrained to come to the conclusion that nature intended man to be carnivorous. The physical constitution of the human race is so ordered that to insure the development of their higher qualities its members are of necessity compelled to become to a certain extent meat eaters. The attributes that make for dominion and progress are but imperfectly present among the eschewers of animal food, and hence vegetarianism causes the downfall of dynasties and leads to the enslavement of peoples. If, continued M. Verrier, the Hindoos, instead of following an absolutely vegetable regimen, had made use of meat in a rational manner, perhaps the British might not have found their subjugation such an easy matter. His argument was equally applicable to the Irish, who lived exclusively upon potatoes. As for the Japanese, with whom rice was formerly the staple food, the energetic nature of this people could not be cited in subversion of the rule laid down in his thesis. The reawakening of the conquerors at Port Arthur and the Yalu River was coincident with the establishment of a trade in butcher's meat throughout their archipelago.—Lancet.

Danger from Steel Buildings.

The true danger to be apprehended in regard to the modern office buildings of mixed steel and masonry construction is from rust. No one knows exactly how the metal in such structures is going to behave, for the reason that such combinations have never before been exposed in the same manner to the action of the elements. We know that iron buried in the heart of thick stone walls, laid in lime mortar, has remained unchanged for seven or eight centuries, presumably through the alkalinity of the lime, which has been known for ages as a powerful preventive of rust. Our high buildings are, however, built with cement instead of lime, and not much is known in regard to the action of cement on iron. Chemically, cement is much less alkaline than lime, and as it is insoluble in water, what alkalinity it possesses can hardly have much chemical effect on the metal. Its insolubility, however, makes walls built with it more impervious to water than those built with lime, and, if the steel structure is well grouted with cement, as is customary, there is reason to suppose that the metal, guarded from moisture by its impervious sheath, which, if it does not contribute alkali, at least contains no acid, may last uninjured for a very long period. Such experience as is available confirms this view, and although architects will watch with great anxiety for any signs of deterioration of metallic structures used in the new manner, as an indication which may assist in devising precautions against such action in future, they have certainly neither forgotten nor neglected anything that the present condition of knowledge affords in the way of information on the subject.—American Architect.

Fortunate Inventions.

MANY LITTLE THINGS WHICH HAVE MADE PATENTEES RICH.

It is noticeable, remarks a Washington correspondent, that most of the big fortunes earned through patents have been gained by small things, such as would not be considered important by the casual observer. A country lass was made independent for life by the simple idea which is represented by the pasteboard compartment tray for packing eggs. She had to put up a great many eggs for market, and the loss by breakage was a serious matter. So she hit upon the notion of providing a separate compartment for each egg, and, inasmuch as pasteboard was cheap and the trays could easily be returned with the boxes that contained them, the problem was solved. It is a fact that people in rural parts invent few things. It was a Maine farmer, however, who patented copper tips for shoes, and it is reckoned that they were worth about half a million dollars to him. He had several boys who kicked out the toes of their shoes, and he found that copper tips made them last three times as long. Hence the idea.

One of the most successful inventors of small things was Crandall. He patented several puzzles that made money, but "Pigs in Clover" was his great hit in this line. At one time he was engaged in the business of making croquet sets, the lawn game being then at the height of its popularity. He devised a method of constructing the boxes, so that the parts were held together by groove and tongue fastenings instead of nails. One night he took home some of the waste pieces to his little girl, who was sick. She found such delight in playing with them and putting them together that her father conceived the idea of making similar blocks for the amusement of children. Such was the evolution of the well known Crandall building blocks.

Another very profitable toy was the invention of a bedridden boy. This was "Dancing Jim Crow," which for a long time was the rage. It is said to have yielded $75,000 in the first year it came out. By a simple bit of mechanism a darky was made to dance on a box. The celebrated "Fifteen Puzzle" was never patented; several inventors claimed to have originated it, and fortunes were gained by the sale of it. Most famous of all patented toys was the "return ball." It was sold for a cent, with rubber string and brass finger ring; yet the profit ran up to an enormous sum. The chameleon top and walking alligator brought fortunes to patentees. The roller skate was another very profitable invention, though it did not begin to make money until the patent had nearly run out, when the craze came.

Hundreds of thousands of dollars have been made by Dennison out of his shipping tags. The idea consists simply in a little ring of cardboard that re-enforces the tying hole and prevents the string from tearing out. A lot of money has been earned by the little brass clip fastening, patented a few years ago, by which sheets of paper are held together. Yet it is an exact copy of a contrivance in bronze that was used by the Romans more than twenty centuries ago. In fact, there are not a few modern inventions which are in reality merely reproductions of antique contrivances. One of these is the safety pin, which was commonly employed by the women of ancient Rome to fasten their dresses. Among the most profitable patents have been various little devices having relation to women's costume, such as the perspiration proof shield of rubber, the idea of substituting the quills of chicken and turkey feathers for whalebone in corsets, and the suspender garter. The last was sold outright for $50,000.

The ball and socket glove fastener is a Frenchman's idea, and it has made him rich. Another successful invention is the double ball clasp for pocketbooks and handbags. It is said that no sort of clasp can be popular unless it makes a noise when it catches. Only a few years ago a lucky man thought of putting a couple of little strips of cork on the nose pieces of eyeglasses to make them more comfortable. Nearly all eyeglasses nowadays have this improvement, and every pair pays a royalty to the inventor. The latest of the very profitable small inventions is the tin cap for beer bottles, which is taking the place of corks. It is cheaper than the cork, more convenient and keeps the beer better. Metal lemon squeezers are undesirable, because the juice of the fruit acts upon the metal and makes a poison. Not long ago somebody thought of making lemon squeezers of glass, and the idea was worth just $50,000 to him.

Tin cans are now made so that they can be opened by simply striking the top with a smart blow. As soon as he learned of the invention, Armour, the Chicago packer, ordered 500,000 of the cans, and the inventor is already independently wealthy. The automatic inkstand, which keeps an equal supply of ink always ready for the pen, is said to have earned $200,000. The "shading pen" has earned a sum even larger. Shoe buttons are no longer sewn on, but are applied with a metal fastener. This idea has been worth a big fortune. A new contrivance that promises to be very profitable is a whistle for bicycles, made on the principle of the siren fog whistle. There was $500,000 in the wooden shoe peg, but the inventor went insane just as wealth was pouring in upon him. Another gold producing patent was the inverted glass bell placed over gas jets to protect ceilings. Great sums have been earned by the rubber pencil tip, barbed wire for fences, and a contrivance for shaving ice. A "hump" on a hook to keep it from slipping out of the eye has made the proprietors of the contrivance millionaires.

One of the most valuable patents was the result of a dream. An engineer named Springer had been trying to devise an automatic lock which would brake a carriage going down hill, so that the driver would not have to get out, but might lock the brake by pulling his horse in. He dreamed that he was driving down a steep hill and had just such a lock on his wagon. He noticed exactly how it was constructed, and on waking he got up and sketched the details of the mechanism. He then went to bed again. Three days later he applied for a patent, which was granted. It yielded $75,000 the first year. Of the heaps of patents issued every week by the United States Patent Office only a very small percentage of them have any practical usefulness. But it is not always possible to judge before a thing has been tried. A few years ago a man thought of inclosing trees in canvas and filling the canvas with deadly gases for the purpose of destroying insects. He was considered a lunatic, but this method is now practiced on a great scale and with much success in California.

One man has patented a scheme for utilizing seaweeds as food, shredding them very fine, drying them, mixing them with sugar and cornstarch, and putting them up in tins. They are guaranteed to last indefinitely. Another inventor proposes to distill whisky from seaweeds. Yet another has a process for making flour from bananas, which are to be sliced, dried in hot air, and pulverized. This flour is nutritious and very cheap. Banana flour, by the way, is already manufactured on quite a large scale in Central America. A process has been patented for making a kind of wine out of over-ripe bananas, pressed and fermented. Sweet potato flour and desiccated mince pie are numbered among the original ideas on the files. An automatic tack driver is a hammer that contains a reservoir of tacks, so that there is no danger of banging one's thumb. Devices for cosmetic purposes are a finger taperer, a contrivance to hold back the ears, a spring to alter the lines of the mouth, a tongue cleaner and an antisnorer. A special novelty in false noses is attached to a spectacle frame, and imitation gold fillings are added to false teeth by burnishing gold foil upon them in spots, so as to make them look more natural.

Artificial hen's eggs are to be made in the laboratory, the whites being a mixture of sulphur, carbon and beef fat, and the yolks of beef blood, magnesia, etc., colored with chrome yellow. The shells are to be shaped with a blowpipe from a moist composition of lime and gypsum. Lockets of asbestos are intended to contain the addresses of people who travel on railways, for identification in case of collision and fire. One inventor proposes to stretch a cable the entire length of the Atlantic coast, some distance from the shore and anchored at intervals. Vessels dragging their anchors and in danger of being wrecked are expected to catch this cable and so save themselves. Another genius proposes that the government shall locate large rifled guns on dangerous parts of the coast, to be loaded with anchors and chains. On being discharged, the anchor unfolds and drops in the sea beyond the vessel, with the chain across her bows, so that the crew will only have to make the chain fast and ride out the storm in safety.

There is a process for preserving oysters in a batter of plaster of Paris. A special sort of cannon is designed to shoot water. It is a fact, by the way, that taxidermists use water cartridges for shooting humming birds, in order not to injure the plumage. One inventor proposes to construct a system of skeleton towers, on the tops of which bombs loaded with liquefied carbonic acid gas are to be exploded, the result being rapid evaporation and a chilling of the atmosphere. This is to be done when the weather is unendurably hot in summer. For the benefit of country folks visiting cities is a device to prevent blowing out the gas. The breath tilts a delicately balanced electrode and gives an alarm in the office of the hotel. There is a pneumatic sole for shoes to lessen the jar of walking, and a process has been patented for weaving textile fabrics from thread spun from peat. A talking watch contains a miniature phonograph and cries out the hour when the stem is pressed. The idea of punching pin holes in eggs to keep them fresh by supplying the contents with fresh air has actually been patented. When the hens go to roost, their weight on the perch may be utilized for actuating a mechanism which shuts the doors of the beehives on the farm, thus keeping out the night flying moths whose larvæ attack the honey and young bees. A washable paper, from which writing in ink may be removed after the lapse of any time, is made of rag pulp, glue and asbestos. The manufacture of it has been forbidden in Germany, because it might help fraud. Another patent is for making gold leaf so thin that four million sheets are required for an inch of thickness. This sort of gold leaf is deposited by electricity on sheets of copper and is quite transparent. Not least interesting is a process for extracting spider silk by machinery from living spiders. The common field spiders of the Sea Islands of South Carolina are preferred, a single one yielding 150 yards of the finest silk. Spider silk is superior in quality to that spun by the silkworm, but the difficulty hitherto has been to obtain it in sufficient quantities for commercial use.—Boston Journal of Commerce.

The Progress of Engineering.

Mr. Wolfe Barry, C.B., gave, says the English Electrical Review, some interesting statistics in his presidential address to the Institution of Civil Engineers, of the progress made by engineering during the present reign. These statistics, as given in the following table, indicate an extraordinary development in the agencies for distributing goods, and for the rapid transit of passengers, and a corresponding increase in the consumption per head of staple products:

	1837.	1896.
Population of kingdom	26,000,000	39,000,000
Miles of railways	1,000	21,000
Capital of railways	£30,000,000	£1,000,000,000
Speed of express trains (miles)	43 (1847)	60
Passengers	23,500,000 (1843)	1,000,000,000
Goods receipts	1,500,000 (1843)	44,000,000
Commercial navy of British empire (steamers) (tons)	70,000	6,500,000
Total (tons)	2,333,000	10,500,000
Tonnage of imports and exports	140,000,000	700,000,000
Coal mined (tons)	65,000,000	200,000,000
Coal per inhabitant (tons)	2·34	4·73
Pig iron made (tons)	3,000,000	7,500,000
Pig iron per inhabitant (ton)	0·1	0·2
Submarine cables (miles)	....	162,000
Death rate in London	24·4	19·5

The remarkable decrease in the death rate of London is no doubt partly due to improved sanitation, but probably also, in part, due to greater facilities for introducing fresh blood afforded by the improved means of transit. It is appalling to think where we shall be, at this rate of progress, in another sixty years. The check is likely to come, in the first place, from the exhaustion of our coal supply, which, as Dr. Hopkinson has recently pointed out, may be earlier than is usually supposed. Already the P. and O. steamers coal at Colombo with Australian coal; a small rise in the price of English coal would bring Australian coal to Aden, from which the steps are few to the home markets.

The Properties of Uranium Glass.

Glass containing uranium, to my mind the most beautiful of all glasses, was brought into prominent notice in the scientific world by the experiments of Stokes on fluorescence. Viewed by any light free from ultra violet light, uranium glass is almost or quite colorless, although some commercial samples containing silver or copper possess and show a tint under these circumstances, but, viewed by daylight or the electric arc, the magnificent green fluorescence or phosphorescence is seen. To the eye a room illuminated by incandescent gas light and one illuminated by the electric arc light are much the same, but a piece of uranium glass, which will not glow in the former, glows brightly in the latter; the incandescent gas light being very poor in ultra violet light, while the arc light is notably rich in ultra violet. Faraday, in lecturing at the Royal Institution in 1859 (Proceedings, ix, p. 160), made a curious mistake as to the fluorescence of uranium glass and similarly fluorescent bodies. He says: "This glow does not extend to all parts of the bodies, but is limited to the parts where the rays first enter the substances." As a matter of fact, the glow is produced in uranium glass all along the path of a pencil of light which enters, provided that light is ultra violet, or contains ultra violet, and if a pencil of such light is projected into a uranium glass lens or prism, the path of the pencil is clearly visible by the glow, and appears like a thick green smoke in a clear medium, affording splendid scope for optical demonstration at the lecture table. Uranium glass, which, like some of the vases now sold in the shops, is colored yellow or green, does not show this phenomenon like a pure uranium glass, but so minute is the amount of ultra violet light required to excite the fluorescence of uranium glass that even yellow samples will show the path of a pencil of sunlight as projected by a lens.—T. Bolas, in Amateur Photographer.

Examining the Heart by the Aid of the Roentgen Rays.

The London Electrical Review states that inasmuch as it has now become an accepted fact that the outlines of the heart, and to some extent its movement, can be seen with the aid of the Roentgen rays and fluoroscope, the former method of measuring the size of the heart by means of percussion is unsatisfactory, owing to the numerous personal factors which enter, and consequently the new method is welcomed. The method adopted by the writer is to place a piece of white paper on the back of a screen and trace the outlines of the heart on it with a metallic pen introduced between the screen and the chest, the point of the pen being readily seen, the outlines thus being traced without difficulty.