### The Cause of the Seawanhaka Disaster.

An important clew to the cause of the disastrous fire on the steamer Seawanhaka, last June, has been disclosed in the breaking up of the metallic skeleton of the wreck. What was left of the steamer, as it lay on the sunken meadow off Randall's Island, East River, was purchased by Mr. Matthew H. Gregory, of Red Bank, N. J., who is now engaged in recovering the iron and copper. In pursuance of this work the shell of the starboard boiler has been stripped off, disclosing the fact that the outermost of the eight large circular flues of the boiler had burst at the point where it joined the back flue sheet. A *Herald* reporter, who had visited the wreck in company with Mr. Gregory, says that the quality of the iron of that part of the boiler was evidently very poor.

"Originally the iron of the flue was three-sixteenths of an inch thick, but in some places near the break it is not now more than one-sixteenth of an inch. The break gave every indication of an explosion. The force which broke it was evidently from the inside of the flue, since the jagged edges turn outward. A few inches from the place of the break the flue has at some time been patched, a fact which has not been developed by the official examinations. The patch is riveted to the flue, and covers a space of about half a foot. Until some better reason is put forward the presence of that patch will be taken as an argument for the weakness of the iron.

"The hole above described was not more than eight inches from the patch, and the wearing out process must have been going on for a considerable time. Mr. Gregory could not say how much the break had to do with the accident, but an expert could easily determine. If the break occurred before the fire, it certainly is large enough to have admitted the water and caused a back draught. That a back draught created the fire is the opinion of four-fifths of the experts who have testified since the catastrophe."

### A New Military Telegraph Line.

The signal service has just completed a telegraph line across the northwestern territories from Bismarck, Dakota, to Dayton, Washington Territory, crossing the Rocky Mountains by the Sohon Pass. For the transaction of commercial business it has offices open at the following points: Bismarck, Rapid City, and Deadwood, Dakota; Bozeman, Helena, and Deer Lodge, Montana; Spokane Falls, Colfax, Almota, Pomeroy, and Dayton, Washington; and Lewiston, Idaho.

### Chicago Manufactures.

Few people have any idea of the rapidity with which Chicago is becoming a great manufacturing center. The statistics gathered by the Secretary of the Board of Trade for the forthcoming census report show 3,752 manufactories in the city, giving employment to 113,507 operatives, and representing a capital of over $80,000,000. The value of the output annually is $249,000,000; value of material used $178,000,000; wages paid, $37,000,000.

### NEW NURSING BOTTLE.

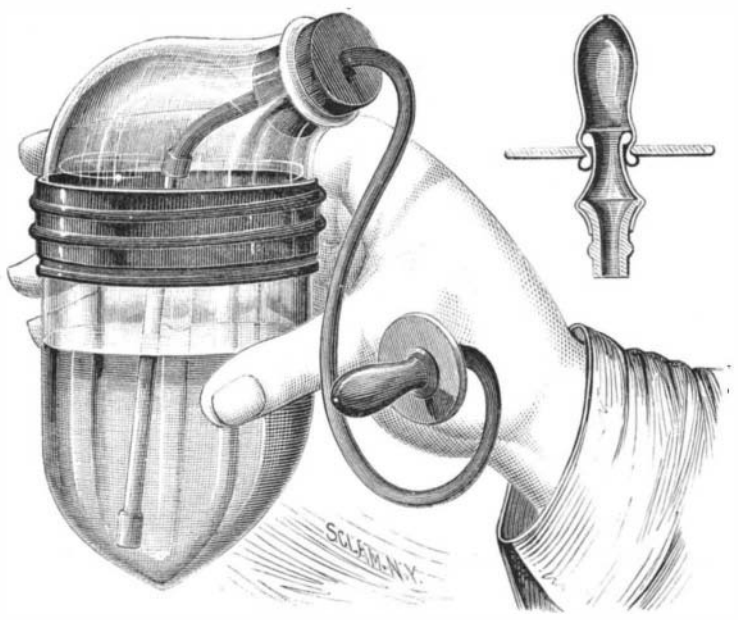
The body of the bottle shown in the annexed engraving is made in two parts, one fitting into the other at their junction, the external one being provided with an internal flange for receiving the packing ring, against which the edge of the inserted part rests. Upon one part of the bottle is formed a bead which runs around it spirally, forming a screw thread which is engaged by a metallic ring fitted over an external flange formed on the other part and capable of drawing the two parts firmly together against the packing ring.

The stopper through which the tube passes is inserted from the inside of the bottle and cannot therefore be drawn out accidentally. The nipple, as will be seen by reference to the small sectional view, is held in place by the shield which is slipped over the portion of the nipple bulged out by the bead formed around the end of the neck of the tube. This forms a very secure fastening for the nipple.

The body of the bottle has an inwardly projecting ridge which insures the greatest possible depth of milk for the inner end of the tube.

This bottle may be readily taken apart for cleaning, and avoids the imperfections found in other bottles.

For further information address the inventor and patentee, Mr. E. A. Barton, 348 Notre Dame street, Montreal, Canada.



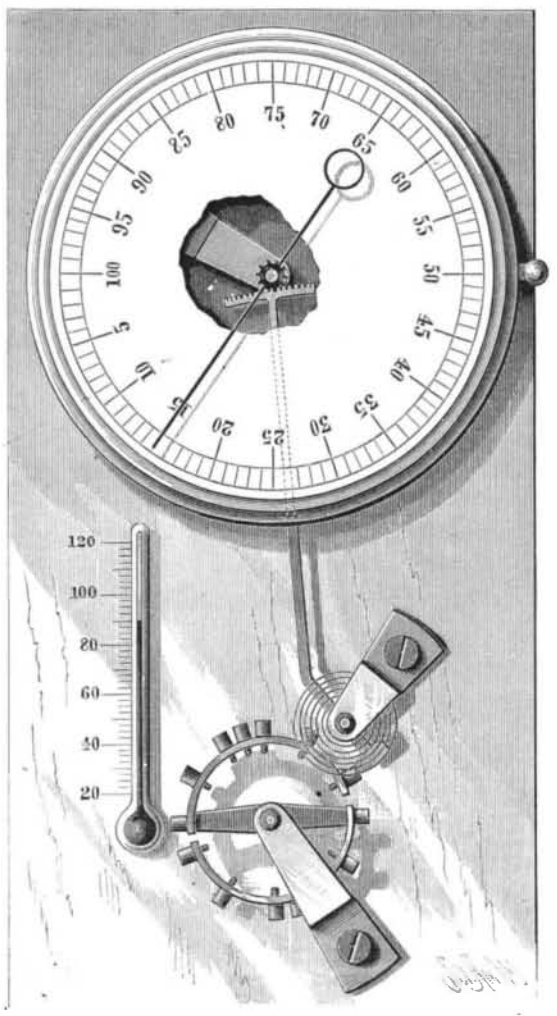
IMPROVED NURSING BOTTLE.

### Plan for Catching the Express Trains.

M. Hanrez, of Paris, is the author of a method of taking up carriages by a train *en route*, in order to avoid stopping trains at stations to take passengers up. A "waiting carriage," fitted with a steam engine with special gear and space for passengers and luggage, is placed on a siding at the station, and picked up by the train as it goes past. The latter, by means of a hook on its last carriage, catches a ring supported on a post, and connected with a cable wound on a drum in the waiting carriage. Thereupon the drum begins to unwind, and in doing so compresses a system of springs, while the carriage is moved at a rate gradually increasing to that of the train. The engine of the carriage then winds in the cable, the train and carriage are connected, passengers are transferred from the joined carriage to the train, and *vice versa*, then the two are disconnected, and the engine of the carriage working on the wheels brings it back to the station whence it was taken.

### APPARATUS FOR ADJUSTING BALANCE WHEELS OF WATCHES.

The engraving shows a device for indicating any alteration



IDE'S APPARATUS FOR ADJUSTING BALANCE WHEELS OF WATCHES.

in the form of the balance wheels of watches, chronometers, and other horological instruments by changes of temperature. The invention consists of a holder for the balance wheel, a multiplying lever, and an index actuated by the lever. The short arm of the lever touches the periphery of the balance wheel, and the longer end carries a curved rack which engages a pinion on the arbor of the index.

By means of this mechanism the slightest change in the form of the balance wheel is indicated by a movement of the index. A thermometer is mounted on the instrument, so that its indications may be readily compared with those of the index.

The inventor proposes to make the instrument double, so as to test both sides of the balance wheel simultaneously.

This invention was recently patented by Mr. F. F. Ide, of Springfield, Ill.

SOME one has said, what thousands have observed, that there is nothing keeps longer than a middling fortune, and nothing melts away sooner than a great one. Poverty treads upon the heels of great and unexpected riches.

### The American Apple Crop.

It is gratifying to be able to record that, notwithstanding the failure of the crop of apples in this country, we are to have abundant supplies from America. Accounts from Boston report the crops to be the largest for many years, perhaps to the extent of 40 or 50 per cent. Up to June 30, 1880, the shipments from Boston to England amounted to 173,379 barrels, of a money value equal to over £70,000. It is expected that with the heavy crop this season the exports for the current year will nearly double those figures. Already large supplies are coming to hand from New York, the Anchor Line steamers arriving at Glasgow last week having over 5,000 barrels, which were sold at moderate prices for the early time of the year. The fruit, as a rule, is of excellent quality, and when it arrives in good sound condition will keep for a considerable time.

Many grocers consider it advantageous to add green fruit to their general stock, and the public begin to find out that they can purchase from the grocer at a cheaper rate than from the fruit merchant. In these times when the grocer is beset on every side by opposition from "stores" and "wholesale retailers," etc., it behooves them to look around for fresh articles for sale whereby they may recoup their loss. To those who have not already done so we would say: Add the green fruit business to your trade, and we are of opinion that you will not have any cause to regret it, provided the business be conducted with care and discrimination, and only such articles purchased as are found to be in demand in their respective localities.—*London Grocer.*

### Fast Horses.

The standard trotter is one that can cover a mile in 2:30. It is said that less than 600 of all the horses raised and trained in the United States have this record. The number that can trot in 2:50 bear the ratio of 1 to 2,383 horses raised. As a business the breeding of fast horses is therefore very much of a lottery; and when we recall the fact that the high prices which famous colts have brought have rarely been received by the men who raised them, the prizes in breeding and training trotters are few and uncertain.

### MECHANICAL INVENTIONS.

Mr. Eugene H. Angamar, of New Orleans, La., has patented a simple and effective apparatus for freeing railroad tracks from snow and ice by heat, more especially street railroads; and the invention consists in a truck fitted for running on the track and supported on hollow wheels, which are fitted with grates for burning fuel, and perforated so that the wheels may be highly heated.

Mr. Hilliard B. Smith, of Stephenville, Texas, has patented an improvement in wind wheels which consists in a novel arrangement and combination of wings or gates in a casing outside and independent of the wheel, whereby provision is made for adjusting the position of the wings, and consequently regulating the speed of the wheel, according to the force of the wind.

An improvement in rotary blowers has been patented by Mr. Charles A. Smith, of Philadelphia, Pa. This invention consists in certain novel details of construction and arrangement of parts which cannot be readily described without an engraving.

Messrs. Conrad Eimbeck and Fritz Wehrmann, of New Haven, Mo., have patented an improved coupling for connecting the forward axles and the bodies of buggies, buckboard wagons, and other vehicles, so constructed as to give the axle a free vertical and horizontal play, and thus better adapt the vehicles for use upon rough, uneven, and sideling roads.

An improved machine for framing timber has been patented by Mr. Richard H. Watson, of Leadville, Col. This machine is intended to accomplish by power the work of framing timber used in mines, shafts, tunnels, and similar underground works. The inventor makes use of a suspended carriage or frame fitted for movement in vertical guides and carrying two horizontal saw arbors fitted at right angles. This is combined with a bed carrying adjustable head and tail blocks for holding the timber and presenting it properly to the saws. A winding drum and friction pulleys feed the saws, and devices of novel character center and clamp the timber.

An improvement in that class of windmills in which the wheel is inclosed in a cowl, has been patented by Mr. Albert S. Dimock, of Hutchinson, Kan.

An improved lifting jack has been patented by Mr. John Paar, of New York city. The object of this invention is to construct a jack that can be made to press both upward and downward at the same time, or to operate either upward or downward, as may be desired.

### Wintering Flower Roots.

The roots of many useful and ornamental plants, such as cannas, dahlias, and gladiolus, may be safely wintered in dry soil by means of external coverings. But as they do not require light during the winter it is safer to lift and store them in a dry cellar or building from which frost is excluded. We find them to keep best, says an agricultural writer, packed in a soil just moist enough to keep the roots from swelling.

### Artisan and Artist.

A critical writer in an English magazine (the *Cornhill*) finds a potent cause for the separation between artistic and industrial work in the rapid growth of the manufacturing system in Northern Europe.

"During the Middle Ages the painter, the sculptor, and the wood-carver were all higher handicraftsmen whose handicraft merged insensibly into that of the decorator, the joiner, the jeweler, and the potter. These lower trades still gave an opportunity for the display of individual taste, of artistic fancy, of that capricious quaintness which forms, perhaps, the greatest charm of mediæval workmanship. But with the employment of machinery the separation became broad and pronounced. Steam-woven patterns and calico prints have superseded the hand-made embroidery and rich brocades of earlier times. Cheap moulded crockery and stamped designs have taken the place of jars turned upon the wheel and painted decorations. Wall papers hang where tapestry hung before, and chintzes cover the chairs that were once covered by delicate needle work. Electroplate teapots, machine-made jewelry, and ungainly porcelain vases replace the handicraft of humbler Cellinis, unknown Ghibertis, or inglorious Palissies. Under the influence of this cause, industrialism became frankly cheap and ugly, while æstheticism retreated into the lofty upper region of the three recognized fine arts.

"In proportion as the industrial system was more or less developed in each European country did the divorce become absolute. In Italy and the south, where the manufacturing spirit never gained a firm footing, individual workmanship survived and still survives. Florentine mosaics, Roman cameos, Genoese filigree work, Venetian glass, are all of them relics of the old artistic handicraft which has lived on unmoved among the quiet Italian towns. In France, more manufacturing than Italy, but less so (at least during the eighteenth century) than England, we find a sort of intermediate stage in Sèvres porcelain and Gobelins tapestry, in Louis Quinze marquetry and Dieppe ivory-carving. But in England the gap was truly a great gulf. Between the Royal Academy and the Birmingham or Manchester workshops there was no common term. Most of English manufactures were simply and unpretentiously utilitarian. They had no affectation of beauty in any way. Whatever art furniture existed in the country—mosaic tables or buhl cabinets in a few noble houses—was brought from those southern lands where industrialism had not yet killed out the native art faculties of the people. A piece or two of Chinese porcelain, a stray bit of Indian carving, an Oriental rug or embroidered cushion here and there carried the mind away to Eastern countries where steam and factories were yet wholly unknown. But in England the stereotyped uniformity of manufacturing ugliness bore undivided sway, and if a solitary Wedgwood at rare intervals had originality enough to set up some attempt at artistic industrial work his aspirations naturally cast themselves in the prevailing classical mould. From these tendencies two evil results inevitably flowed. In the first place, art came to be looked upon by the mass, even of the middle classes, as something wholly apart from everyday life. The æsthetic faculty was a sense to be gratified by an annual visit to the Academy, an occasional perambulation of the National Gallery, and perhaps a single pilgrimage during a lifetime to Rome and Florence. For the lower classes art ceased to exist at all. Their few sticks of furniture, their bits of glass and crockery were all turned out on the strictly manufacturing pattern, with the least possible expenditure of time and money. Only the extreme upper class, the landed aristocracy and very wealthy merchants, could afford to live in an atmosphere of pictures and statues, of Italian art furniture and Oriental porcelain."

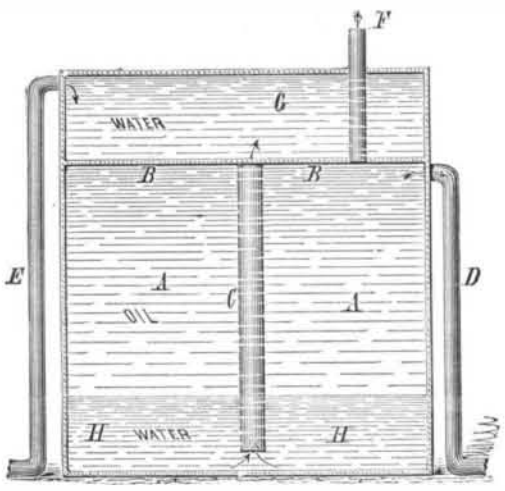
The only fault to be found with our critic's statement of the case lies, we take it, in the assumption that "industrialism" is essentially and of necessity unartistic. It would be nearer the truth to say that when manufacturing began in the north of Europe the working people were grievously deficient in artistic taste, and so were the multitude who furnished a market for the manufacturer's wares. They had no "native art faculties" for manufacture to destroy. It was with them a step upward—from nothing to something—even though that something was cheap and ugly. The pottery and other wares turned out by English manufactories were not beautiful at first, not so much because of the necessary limitations of the scope of power machinery and large production, as because of the general lack of taste on the part of the makers and users of the wares. With the social and intellectual elevation of the masses the level of popular taste has risen, and our large factories have steadily improved the artistic character of their work to meet the rising demand. Meantime, while our artisans have been developing as artists, marrying beauty with utility, it has become the cant of the picture makers and their followers—artists *par excellence* in their own estimation—to associate æsthetics solely with inutility, and to deny the artisan's right to consider himself an artist, except when he makes or imitates something that the world has no longer any use for.

There is no portion of the community more pitifully destitute of genuine art sense than those who declaim most loudly about the necessary ugliness of modern manufactured products, and simper over the "exquisite loveliness" of such bits of ancient or oriental stuff as it is the current fashion to call artistic. Next year the same things and styles may be out of fashion. Those who rave over them now will then pronounce them vulgar and ugly, and torture their æsthetic sensibilities over some other antique novelty; all the time fondly imagining that the soul of art dwells exclusively with them. It never occurs to them that their followers a hundred years hence will rave in the same way over the works of the artistic artisans of to-day.

### LIGHTNING-PROOF OIL TANK.

The enormous losses that have been incurred of late years from tank fires, the danger which threatens from the ignition of stored oil to whole towns and cities, have excited the attention not only of oil men, but scientists at large to the means of securing effectual protection. It is evident that the methods of storage ordinarily adopted have proved ineffectual; the precautions taken against lightning, or from conflagration of the contents of tanks from others that have caught fire, have proved worthless. The means of securing immunity from lightning have been studied philosophically and scientifically by Col. E. A. L. Roberts, of Titusville, Pa., and by the aid of a diagram we will explain it for the benefit of our many readers connected with the oil business. The principle on which it is based is that oil will not catch fire until vaporized, in other words, until it is blended with a certain proportion of the oxygen of the atmosphere. A ton of glycerine has been exploded in oil wells in Pennsylvania without setting them on fire, simply because the oil was under conditions that did not allow of the immediate blending with it of air or oxygen. Exclude these agencies and one might as well attempt to set fire to water.

Col. Roberts accordingly conceived the idea of so constructing tanks that they would not allow of evaporation; in other words, tanks with which no air could come in contact. His tanks, constructed as follows, completely compass this purpose: A A, space in tank for oil; B B, diaphragm; C, balance pipe; D, filling and drawing-off pipe for oil; E,




OIL TANK PROTECTOR.

overflow and inlet water pipe; F, vent pipe; G, water reserved on top of diaphragm; H, water in bottom of tank.

It is easy to show by reference to this diagram that there can be no possible liability to conflagration. Instead of the roofs now used the surface of the tank would be covered with a diaphragm. This diaphragm is of iron, and is so placed as to leave a space of a few feet between it and the top line of rivets. An eight inch pipe termed the balance pipe passes from this diaphragm down the middle of the tank to within eight inches of the bottom. The tank is filled with water by means of the pipe, D, which enters the tank immediately under the diaphragm. As the water fills up, it ascends the balance pipe, forcing the air completely out of the tank through the vent pipe, F, and the pumping is continued till it reaches up to the rim of the tank. The process of filling the tank with oil now commences by means of the pipe, D, which is also the filling and drawing off pipe for oil. Thus the oil is pumped through the same pipe through which the water has been forced. As the oil settles upon the top of the water, immediately under the diaphragm, the force which the pump gives to the oil then presses the water, as the heaviest substance, downward, and it passes up the balance pipe into the space marked G, the surplus passing away through the overflow pipe to the left of the tank in the above diagram, and marked E. On the space reserved for oil being entirely filled from under the diaphragm to the lower end of the pipe there remains about six inches of water, while the diaphragm and the sides of the tank being air-tight, no air whatever can mingle with the oil, which will also be protected above by its overlay of water above the diaphragm. Thus situated the oil may be said to be hermetically sealed when the top cock at the head of the vent pipe is turned off. It is obvious that in running the oil out no air can get access to the interior. To force it out by the pipe, D, water is pumped in by the overflow pipe, E, the water exerting the necessary pressure. In running down the balance pipe from the reserve tank above the diaphragm the water fills the exact place of the discharged oil.

### Instruction in Industrial Art.

THE American Carriage Builders' Association, in convention at Chicago, October 21, adopted a resolution for the establishment of a school of technology in this city, especially devoted to the art of carriage building.

The trustees of the New York Metropolitan Museum of Art had expressed a willingness to add a branch to the museum devoted to art instruction and original designing, in connection with carriage building, if a fund of $1,000 a year for three years were guaranteed. More than this sum was promptly subscribed. The aim of the trustees of the museum is, we believe, to establish industrial art schools for the benefit of American artisans in all the trades.

### MR. EADS' SHIP RAILWAY FOR THE AMERICAN ISTHMUS.

For many years the popular idea has been that whenever the genius and energy of man should overcome the barrier to commerce which nature has placed at the American Isthmus, it would have to be accomplished by a ship canal. For many years exploring parties, supported by private munificence or by government appropriations, have been searching for the most favorable lines for transisthmian commercial routes, always contemplating the ultimate construction of a ship canal. And so persistently have the advantages and disadvantages of the different canal routes been insisted upon by their respective admirers and opponents, that there are few engineers of high rank, who have considered the question at all, who have not pronounced in favor of one or other of the several canal routes that have been surveyed.

Accordingly, when a new man enters the field with a novel plan, confidently offering to make a dry way for the world's commerce over the Cordilleras, in a quarter of the time and at a quarter of the cost of a ship canal such as Mons. De Lesseps proposes, the natural inquiry is, "Who is he? and what has he done to justify so bold a traversing of the opinions of the world's best known engineers?"

The world's best engineers do not need to have that question answered for them, though the general public may. The engineering world have already admitted Mr. Eads to an honorable place in the front rank of scientific and practical engineers. They know him as a man quite as remarkable for the soundness of his views, in great engineering emergencies, as for the boldness and originality of them. They know him, too, as a man whose professional career has been marked by grand successes as well as grand undertakings—successes achieved in more than one instance by methods as original as they were scientific and simple, accomplishing results of unequaled magnitude with the least delay and the greatest economy.

When the exigencies of civil war called for the immediate and speedy creation of a new order of war vessels, suitable for river navigation, yet capable of successfully assailing land batteries protected by earthworks, it fell to Mr. Eads to supply the need; and his fleet of "improvised ironclads" played a vital part in opening the Tennessee and the Mississippi.

When the requirements of peaceful commerce demanded an iron way across the Mississippi at St. Louis, a bridge which should offer no impediment to the commerce of that broad river, the same bold and practical spirit not only planned the structure, but saw it built, a work requiring the highest engineering and financial capacity, for the problems presented were in many respects not only novel in character, but involved operations of a magnitude never before undertaken.

Still more recently, when the general commerce of the great artery of the continent required a freer outlet below New Orleans, and when the government engineers were committed to a costly canal, Mr. Eads came forward with a solution of the problem directly contrary in its principles to that which had been proposed, and vastly less expensive in time and money. Still more, he was willing to stake his private fortune on the event, confidently undertaking to open the Mississippi in his own way at his own risk, asking no pay for his work until his scientific and official opponents should certify that the task had been successfully accomplished. Our readers do not need to be reminded of the magnitude of the work undertaken at the mouth of the Mississippi, the severity of the engineering problems it involved, the vast economy of the jetty system, or the marvelous celerity and certainty with which it overcame the barriers which nature had placed at the outlet of the great river.

In place of a doubtful channel admitting only vessels of less than eight feet draught, the Mississippi now offers a broad free entrance to the largest ocean steamers; and to emphasize the fact, which the commercial world is slow to realize, the merchants of New Orleans are arranging for a visit to their wharves by the Great Eastern.

These great achievements are referred to here simply as evidence that Mr. Eads is not a novice in engineering and finance, nor a speculative adventurer, but a scientific and notably practical man, whose large and varied experience in the planning and conduct of great enterprises gives pertinence and weight to any proposition which he may lay before the world. Whatever problems of engineering, mechanics, or finance may be involved in the planning and construction of a ship-canal or a ship-railway across the Isthmus, and no one will question their multiplicity and magnitude, they have already been met and successfully overcome by him elsewhere, on a scale not out of comparison with those of the new undertaking. In laying before the world a plan of a ship railway, like that which we illustrate on our first and fourth pages, Mr. Eads offers no speculative project, but the well-considered design for a capable and experienced engineer, a working plan which can be carried out with absolute certainty.

At first thought most persons unfamiliar with the resources and practices of modern engineering are apt to look with incredulity, if not with amazement, upon a project