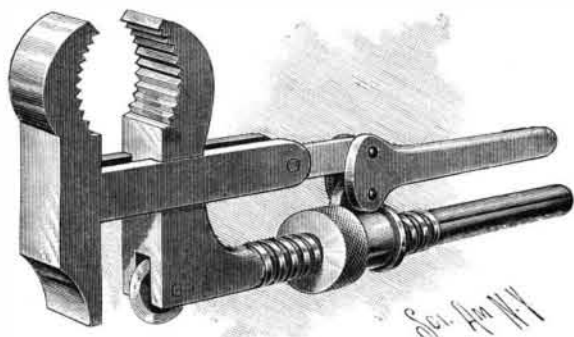


AN IMPROVED WRENCH AND CUTTER.

A tool adapted to use as a wrench for ordinary purposes, and also as a pipe wrench or pipe cutter, is shown in the illustration. It has been patented in the United States, England and Canada, by Mr. Theodore Fletcher, of Macdonia, Texas. The shank or handle of the wrench, which is integral with its inner jaw, has a screw-threaded portion on which is mounted a spool-shaped nut, carrying a collar to which is pivotally connected a lever, the latter being pivotally connected by means of a link with the shank of the outer jaw.



FLETCHER'S WRENCH AND CUTTER.

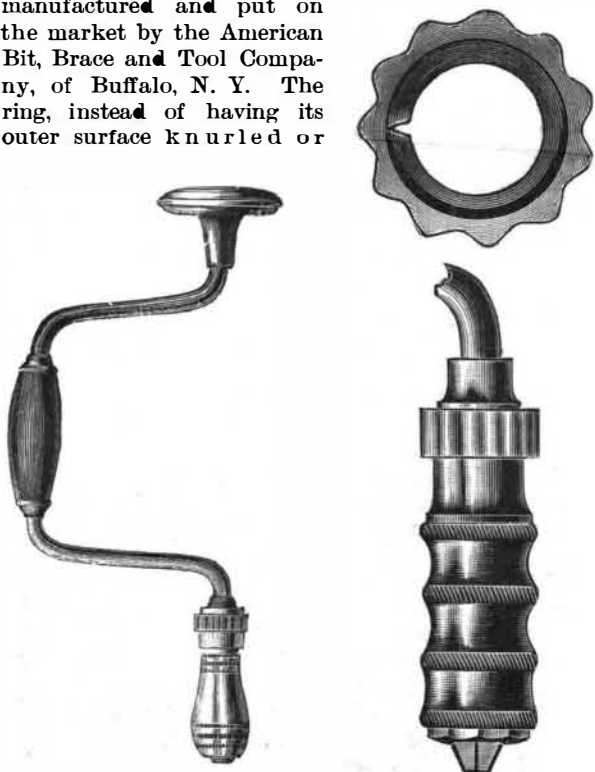
Both jaws have at one end flat surfaces, to engage a nut, while at their other end they have concave toothed surfaces to clamp a pipe. A removable rotary cutter is secured on a pin in a recess in the flat surface of the inner jaw. By gently squeezing the handles together, after the jaws have been adjusted upon a nut or pipe, an exceedingly firm grip is obtained, its pressure increasing with the strength of the pull, while the jaws may be automatically opened by slackening the hold upon the two handles, thus enabling the tool to be used almost as a ratchet wrench, and saving much time. When the cutter is to be used, after adjustment with the wheel in place, the lever affords means of bringing all the force desired upon the cutter.

Discard the Old—Get the Best.

Only a practical man can appreciate the immense advantages which arise from the use of good machinery. To the manufacturer whose capital accrues large interest through the aid of his employes and machinery, it may seem unreasonable that machinery, which in his estimation should last forever, rightfully belongs to the scrap pile. A little common sense, and just a bit of mathematical computation, however, says the *Woodworker*, will usually abolish such illusion. Notwithstanding the most careful attention that can be given it, the time surely comes in its life when age and the effects of repairs render a machine unfit for further service.

AN IMPROVED CORRUGATED BIT BRACE RING.

The illustrations represent an improved form of corrugated ratchet ring for bit braces, which is being manufactured and put on the market by the American Bit, Brace and Tool Company, of Buffalo, N. Y. The ring, instead of having its outer surface knurled or



IMPROVED BIT BRACE RING IN PLACE.

milled, as usual heretofore, has a corrugated surface, as more plainly shown in the small sectional view, the other views showing the ring in position on the brace. This form of ring is designed to enable the workman to obtain a firmer grip in using the brace, being deemed especially advantageous when the hands are moist or greasy. The improvement will commend itself particularly to plumbers and linemen, as well as to carpenters and mechanics generally.

HYDRAULIC PROPULSION OF VESSELS.

Improved means of applying the jet principle in the hydraulic propulsion of vessels are shown in the accompanying illustrations, Fig. 1 being a sectional and Fig. 2 a plan view of a jet-propelled vessel patented by Mr. James C. Walker, No. 1741 De Sales Street, Washington, D. C. Main pipes, A, one on each side, open into the water at the bow, and extend back through the boat near the keel, having a slight decline and diminished size from bow to stern, where they discharge. Smaller pipes, B, extend from the main pipes through the sides of the boat, where they terminate in nozzles which may be turned in any direction by means of levers, C. Air and waste water pipes, D, lead from near the bow to a well or reservoir, E, at about the lowest point in the bottom of the boat, to draw in pure air and remove water from the front part of the boat. From this reservoir a waste water pipe, F, extends close to the keel to an outlet near the stern, and other pipes, G, H, lead from the reservoir to an outlet at the stern above the water line. In the main pipes, A, near the bow, are force water wheels or propellers, each having a rim fixed to the outer edges of its blades, so that the wheels will work close to the inner surfaces of the pipes, and these propellers force the water through the pipes, branches and nozzles, with great velocity. The stern nozzles are straight, but so jointed to the main pipes that they may be readily turned to the right or left by levers connected with the engine room or pilot house, the vessel being thereby steered with great facility. There are valves in the main pipes to shut off water from the front in case of accident or when at the wharf, and valves, I, in the main and suction pipes, are adapted to shut off water from the stern nozzles when the vessel is moving backward or standing still. By means of the side nozzles the boat may be steered in any direction without rudder or using the stern nozzles, and if the boat should get aground, the directing of the nozzles down-

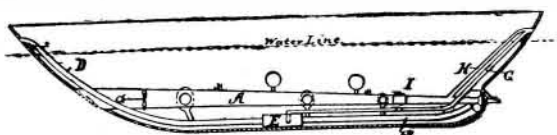


Fig. 1.—WALKER'S JET-PROPELLED VESSEL.

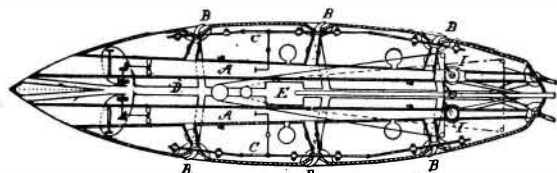
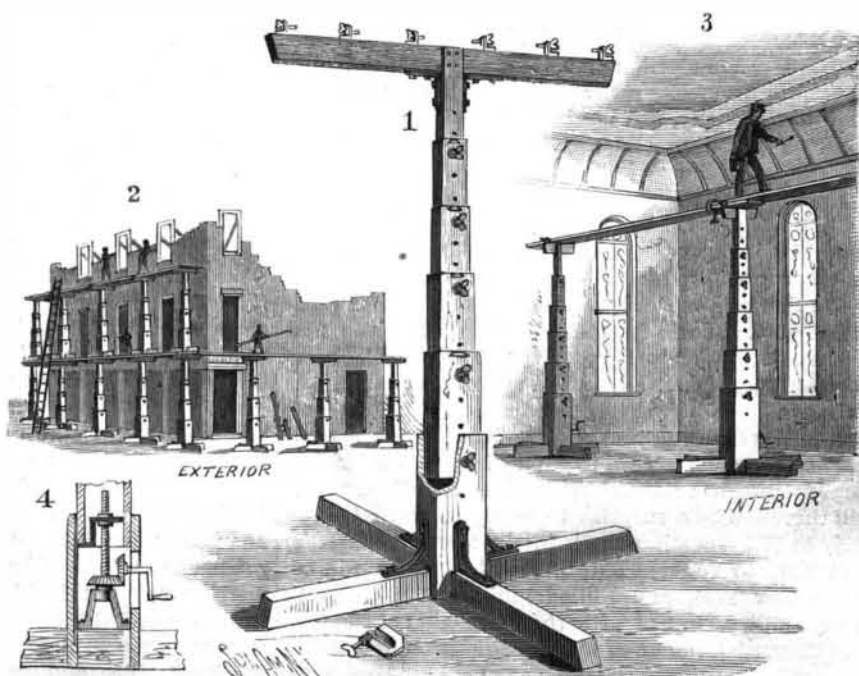


Fig. 2.—WALKER'S JET-PROPELLED VESSEL.

ward would not only tend to lift the boat, but to scour out the bottom under it. The drawing in of so much water at the bow, thus saving the force which would otherwise be required to push this water out of the way of the vessel, is designed to be especially advantageous, the force thus expended also operating as a suction to draw the vessel forward.

AN IMPROVED SCAFFOLD TRUSS.

The construction and use of an adjustable telescopic scaffold truss, to facilitate the repair of ceilings and all kinds of outside work upon buildings, are represented in the accompanying illustration. The improvement has been patented by Mr. Thomas Kennedy, No. 279 West 118th Street, New York City. Fig. 1 shows the truss in perspective, Figs. 2 and 3 illustrating its use, and Fig. 4 being a section of its lower portion, showing how a close adjustment of the truss may be made for a particular elevation. The telescoping sections are similarly constructed, of consecutively diminishing size transversely, and the whole is mainly of wood, so that it may be readily built by any carpenter. The several sections are vertically adjustable by means of bolt holes in opposite sides, through which are passed detachable screw bolts, fitted with locking nuts. For a nice adjustment, after the truss has been extended to the approximate height desired, the bottom section is fitted with a crank and gear, actuating a screw, as shown in Fig. 4, by means of which the other sections may be collectively raised or lowered. The top section is provided with short or long heads for the support of the scaffold floor, the planking of which is held in place by screw irons on the head, and a screw clamp is provided for readily binding in place top planks

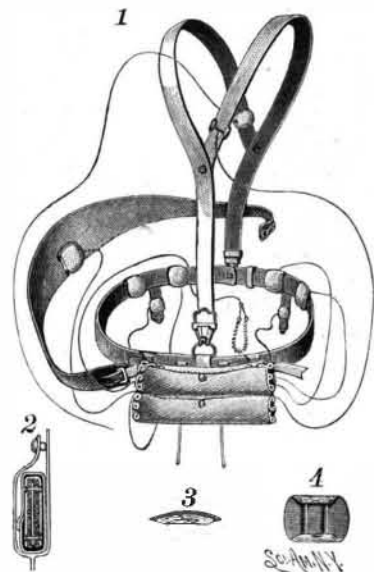


KENNEDY'S SCAFFOLD-SUPPORTING TRUSS.

or stretchers. The adjustment of all the parts is effected without the use of a nail, so that the scaffolding may be readily put up and taken down with little or no noise, and the entire structure, when not in use, can be closed up, so as to occupy but little space.

AN IMPROVED ELECTRIC BELT.

A belt to be buckled around the waist, and supported by shoulder straps, the belt carrying a battery and attachments for sending a current of electricity through the body in the treatment of acute and chronic diseases, is shown in the illustration, and has been patented by Dr. George F. Webb, of Cleveland, Ohio. Fig. 1 represents the complete apparatus, Fig. 2 a cross section through one of the batteries and its case, and Figs. 3 and 4 a cross section and inverted plan of one of the electrodes. The battery cases at the back of the belt are attached thereto by buttons, any desired number of such cases being used, and each battery is in a waterproof pocket, preventing injurious effects from the acid. The battery consists of a number of connected elements hinged together to conform to the movements and shape of the body, the elements comprising a central copper plate, inclosed by a jacket of absorbent insulating felt, and an outer double zinc plate. The several elements are connected together by copper hinges, so that the entire force of the battery may be used when necessary, the hinges connecting the zinc plate of one element with the



WEBB'S ELECTRIC BELT.

copper plate of the next, and suitable terminals are provided for the attachment of conducting cords or wires. An adjuster or cut-out is also provided for use in case only a portion of the battery power is required. Connected with the battery by the conducting cords are the electrodes on different parts of the apparatus, to contact with the body. The electrodes are preferably made of aluminum, of oval convex shape, as shown in Figs. 3 and 4, and are bent to form a clasp readily engaging the belt or straps on any desired part of the breast or back. A neck band is also provided on which an electrode may be used, the electrodes being arranged according to circumstances to contact with the necessary parts of the body, while the amount of the current is regulated by the adjuster.

An Improved Aspirator.

Dr. Smith, in the *Medical Record*, says an aspirator which any one could make had been first used by him during the civil war. Take a quart bottle, a tightly fitting cork, pierce the latter with a glass tube, attach to this one end of a rubber tube and the other end to an aspirator needle. Put a drachm of ether into the bottle. Put in the stopper, set the bottle into hot water, and when the ether has become vapor, take it out of the water, introduce the aspirator needle, and as the ether condensed on becoming cool, it would form almost a complete vacuum in the bottle, so that nearly a full quart of fluid would be drawn into it.

Lamination in Metal.

Prof. John Tyndall contributes something new upon the subject of cleavage, as it occurs in crystals, rocks, ice and other bodies; and his studies lead inevitably to the conclusion that lamination results from the operation of the same laws under analogous conditions as those which produce the property known in mineralogy and crystallography as cleavage.

At first one would suppose wax, or baker's dough, to be most unlikely substances wherein to detect any tendency to cleavage; yet it is precisely with these materials, wherein plasticity is a most prominent physical property, that Prof. Tyndall has performed experiments that are commanding the attention of the scientific world, and the results of which have an important bearing upon the metallic processes. In these plastic materials and others, such as clay and graphite, Prof. Tyndall has proved that cleavage may be developed in as marked a degree as in slate—even the varieties of the latter used for roofing—by the simple application of pressure to the plastic mass. Cakes of wax that have been thus treated are easily split up into regular laminae, so uniform in character as to excite the surprise and admiration of those who have witnessed the experiments.

These researches appear to have proved that any material, no matter how plastic or how homogeneous it may appear to be, has within it the condition for the development of cleavage, and that the only external condition necessary to produce lamination is a sufficient degree of pressure exerted in one direction upon the mass. The resulting planes of cleavage will be at right angles with the direction in which the pressure is applied. The philosophy of this effect lies in the fact that, as relates to the cohesion of its particles, no substance is strictly homogeneous; that is to say, the particles, granules or molecules of substances do not possess cohesive power equally in all directions; and hence, when pressure is applied to them, they slide over each other (the sliding surfaces being those of least cohesive power) and move toward a point of less pressure. In the case wherein pressure is applied in one direction only, the sliding will be in a direction at right angles with the direction of the pressure, and thus plates, laminae or strata are generated in the mass, the limiting faces of these layers having less cohesion than their interior parts.

It is thus that under the action of the rolling pin flaky pie crust is formed. The same kind of stratification is formed in a biscuit, while in bread, the loaves of which are shaped by kneading, this stratification is absent, and a fibrous structure—called by bakers the "pile"—results from the difference in the manipulation. It is entirely indifferent what kind of material is thus operated upon, provided that it will in some degree yield to pressure without crushing into powder; the result of pressure exerted in one direction more than in any other will result in lamination more or less marked. An illustration of this kind of action is found in iron and other metals. When iron undergoes the ordinary process of rolling it is taken at a welding heat from the furnace, and the uniformly distributed heat weakens the cohesive power of the particles quite equally throughout the mass; the result is a fairly homogeneous bar or plate. However, in bars the tendency to longitudinal stratification is manifest, and when the bars are cold and cohesion has again been restored to its normal power, it can always be found that iron so produced is stronger longitudinally than laterally.

The Bell Telephone Instrument.

This patent expires and becomes public property in 1894. The Bell receiver is in some respects a superior transmitting instrument, so the *Electrical World* says, to any of those especially designed for the purpose, in that it introduces no local disturbances, such as are inseparable from variable contacts. The microphone transmitter is, indeed, a convenience, but, as before stated, by no means an essential. For long distance work in telephony, as in other transmissions of electrical energy, high potentials are necessary, and for this purpose the use of the induction coil in connection with the microphone, to transform the local currents of low potential into those of high potential for transmission, was early adopted. But the same effect exactly can be produced by properly winding the coils of the Bell receiver with an additional number of turns of fine wire. It will be remembered that for the first year and a half or two years of the art of telephony the microphone was not used at all. Two instruments exactly alike of the Bell type were employed, one as a transmitter and the other as a receiver. It is not, however, so generally known to what distance a transmitting instrument of that kind is generally effective. It will therefore be a surprise to many to learn that as early as 1879 speech was distinctly transmitted from New York to Yonkers, a distance of 25 miles, and between New York and Philadelphia, a distance of 90 miles, and that in 1883, after the completion of the Postal Telegraph Company's lines to Chicago, conversation was carried on during the day time between New York and that city, notwithstanding the fact that the wire

was grounded at both ends. The wire used in this experiment was one of the regular wires used for telegraphic purposes by the Postal Telegraph Company, and was a compound wire composed of copper and steel, the former metal being employed to add conductivity, and the latter to give strength to the wire. Our recollection is that it was a No. 8 B. W. G. Conversation was also carried on at about the same time between New York and Cleveland, the Bell instrument being used in all these.

Decisions Relating to Patents.

REISSUE OF LETTERS.

In his affidavits accompanying an application for an original American patent the patentee swore that the invention was the same as that covered by a British patent issued to him in 1889. In an action for infringement of a reissue of this patent defendants claimed that the first claim of the reissue was identical with a prior English patent issued to the patentee in 1888. It is held by the Circuit Court that, even if this were true, and the affidavit consequently false, there being no other evidence of fraud, the whole of the reissue was not invalidated thereby, it appearing that the question of identity may have been a doubtful one, which the applicant would probably leave to his attorney. 1.

After the reissue of the original American patent, and before his application for the reissue, the patentee applied for a second American patent, swearing that the invention therein claimed had never been patented, with his knowledge or consent, in any country. This statement was untrue as to part of the claims, for they had been described in the English patent of 1889. The Circuit Court decides that this false statement, in the absence of the other elements of an estoppel, did not preclude the patentee from asserting the claims of the reissue.

The court also rules that the fact that the claims of the reissued patent No. 11,153, granted March 24, 1891, to John B. Dunlop, upon original patent issued to him, September 9, 1890, for pneumatic cycle tires, omitted certain strips of elastic material, which, by the original patent, were to be inserted between the edges of the wheel rim and the strengthening folds enveloping the tire, so as to protect these folds from injury by the edges of the rim, did not invalidate the reissue by thus broadening the claims, for these strips were not essential to the combination, and did not involve inventive skill, and it appeared that no adverse rights accrued in the meantime, and that the reissue was applied for within four and a half months from the date of the original. 2.

The Circuit Court lays it down that reissued letters patent No. 10,600, granted May 26, 1885, to the Carpenter Straw Sewing Machine Company, as assignee of Mary P. C. Hooper, upon original letters patent dated January 4, 1876, for improvements in straw braid sewing machines, are void as to the amended fifth claim, wherein a new element, viz., a lip, is added to the combination claimed.

The court also holds:

(a) Where a claim in reissued letters patent covers a combination to which a new element has been added, it is in legal contemplation "broadened," and is invalid when it covers machines used for long years by innocent parties, without infringement of the original patent, with the knowledge of the patentee, and without interference by him.

(b) Even where the invention covered by reissued letters patent is described in the original and the claim of the reissue is narrower, but covers machines used for long years by innocent parties without molestation and without infringement of the original patent, such narrowed claim is void.

(c) For a reissue to be valid as covering "the same invention" as that in the original, within the meaning of Rev. St. § 4,916, the patentee must have described and intended to secure in the original the invention of the reissue. 3.

DESIGN PATENTS.

Letters patent No. 408,416, issued to William C. Krick, are for an improvement in floral designs, whereby, instead of tying single flowers to a toothpick and sticking them into a floral piece, so as to form a letter or design, the letter or design is first cut out of some stiff material, the flowers fastened to it, and when the form is complete it is fastened to the floral piece by toothpicks. It is held by the Circuit Court that a want of patentable novelty is not so manifest on the face of the patent as to render a bill for infringement demurrable. 4.

The Circuit Court decides that design patent No. 20,347, issued November 25, 1890, to Frederick Bergner, for an album case set upright on a baseboard, and having on its exterior an oval ornamental frame, with an open center, is invalid, since the patentee invented neither the album case nor the ornamental frame, but merely conceived the idea of placing the ornament on the case; and this conception is not patentable, for the statute only provides for patents on designs for articles of manufacture and for ornaments to be placed upon or worked into such articles. 5.

PATENTABILITY.

The United States Supreme Court holds that the first claim of letters patent No. 224,991, issued March 2, 1880, to A. W. Brinkerhoff, for an improvement in "rectal specula," consisting in a slide extending the entire length of the tube, is void, in view of the prior art; and the fact that the slide of the patent is of metal, while former slides were of glass, is immaterial, since the material of which the slide is composed was not claimed as an essential feature of the device. 6.

It is held by the Circuit Court that letters patent No. 308,116, issued August 5, 1884, to Sarah Caverly, for a machine for rounding bent handles, consisting of a cylindrical cutter head, revolving vertically, having in the center of its periphery a groove, with cutterknives set diagonally, and adjusted from both sides of the cutter head into the groove, are void for want of novelty, such cutter heads, either made in a single piece or made of two disks, having been in use long before the date of the invention. 7.

The Circuit Court rules that the 5th, 6th, and 7th claims of reissued letters patent No. 8,765, dated June 24, 1879, to Jay S. Corbin, for an improvement in wheel harrows, consisting of the combination with a gang of rotating harrow disks of a lever for setting the same, are void for want of novelty, the improvement being merely a change in the location of the lever previously used. 8.

The Circuit Court of Appeals lays it down that the first claim of letters patent No. 154,293, issued August 18, 1874, to William Starling, for an improvement in sulky plows, consisting of the combination of a crank bar with the plow beam, lever, and axle, so that the horses are made to raise the plow out of the ground, is void for want of novelty. 9.

It is held by the Circuit Court of Appeals that letters patent No. 354,717, issued December 21, 1886, to P. P. Mast, for an improvement in cultivators, consisting in the construction of couplings by which the beams and alignment rods are connected with the axle, and in the construction of the beam brackets and crossheads which carry the shovel standards at the point where the brackets and standards join, so as to maintain the alignment between the shovels and the axle, irrespective of a change in the lateral position of the shovel beams, are void for want of novelty. 10.

1. Featherstone v. G. R. Bidwell Cycle Co., 53 Federal Reporter, 113.
2. Same.
3. Carpenter Straw Sewing Machine Co. v. Searle, 52 Federal Reporter, 809.
4. Krick v. Jansen, 52 Federal Reporter, 823.
5. Bergner v. Kaufmann, 52 Federal Reporter, 818.
6. Brinkerhoff v. Aloe, 13 Supreme Court Reporter, 221.
7. Caverly v. Deere, 52 Federal Reporter, 758.
8. Galt v. Parlin & Orendorff Co., 52 Federal Reporter, 749.
9. Starling v. Weir Plow Co., 53 Federal Reporter, 119.
10. P. P. Mast & Co. v. Rude Bros. Mfg. Co., 53 Federal Reporter, 120.

Period of Infection in Mumps.

The question as to the transmission of the infectious diseases and the exact stage of the disease at which infection is most likely to occur has been satisfactorily settled regarding most of the exanthemata. In mumps, however, the case is different, some authorities maintaining that the disease may prove infectious throughout the whole of its course, while others are of opinion that this is only the case at the commencement of the attack. Dr. Rendu, in a paper read before the Société Médicale des Hopitaux, related two cases which are valuable as throwing light upon this point. A young lady visited her mother on Jan. 2, who complained of slight malaise; on the following day, however, she developed mumps. On Jan. 24 her daughter, who had seen her on the second, but not since, was likewise attacked. In the interval she had seen no person who was suffering from the disease. Dr. Rendu argues, therefore, that a case may be infectious even before the characteristic parotid swelling has made its appearance. A second case was very similar to this one. A child ten years old was attacked after being in company with a friend who, although then showing no signs of the disease, was found a few hours afterward to be suffering from it. Mumps is, therefore, evidently infectious at the termination of the period of incubation. Dr. Rendu is of opinion that infection is conveyed by means of the breath.—*Lancet*.

In an interview on the subject of the extensions and alterations of the elevated railway system by a *Tribune* reporter with one of the directors, the latter evidently expressed himself somewhat differently from what he intended.

Reporter: "Do you think the present elevated structure strong enough to support the further weight of three tracks and more rapid trains?"

Mr. Sloan: "Certainly; you have no idea of the anxiety with which our engineers watch the present structure. It is carefully examined continually."