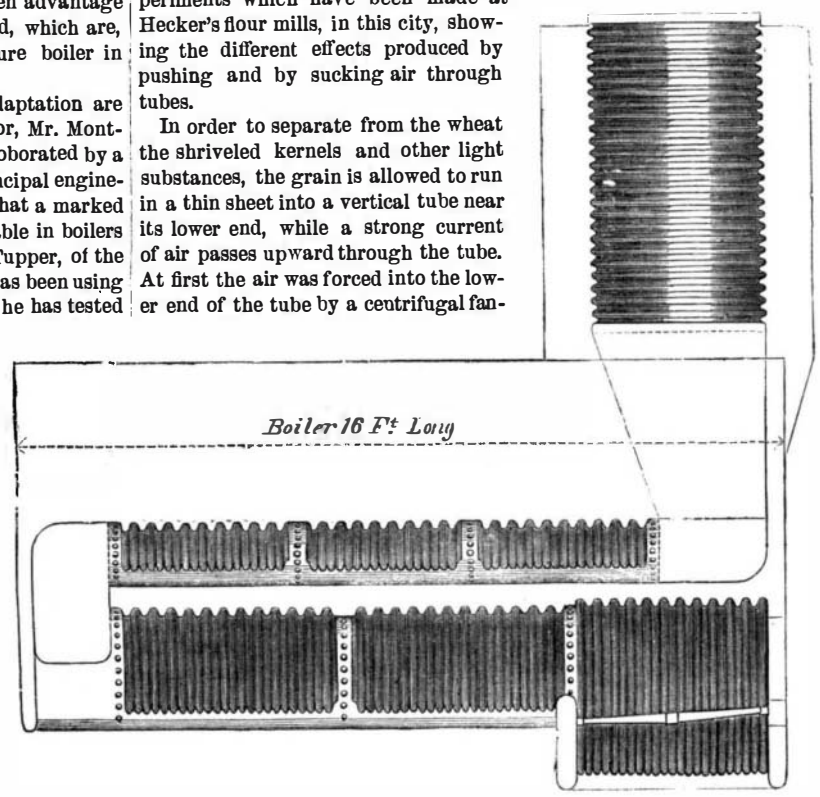
Improved Corrugated Iron Boiler.

The steam boilers herewith illustrated are peculiar in many respects; the chief point where they differ from others is in the character of the iron composing them. This iron is of the kind known as "corrugated," which means simply so rolling the sheets that instead of having a plain flat surface there are a series of arches throughout or over the whole surfaces. This method of treating boiler-iron renders it immensely stronger for the same weight of metal than a plain sheet, and this peculiarity is taken advantage of in the plans which are shown annexed, which are, a long cylinder boiler, also a low pressure boiler in section.

The advantages claimed for this adaptation are many, and it is asserted by the inventor, Mr. Montgomery—whosestatements are also corroborated by a large number of certificates from the principal engine-makers and engineers of the country—that a marked improvement over old forms is observable in boilers now in use on his plan. Capt. C. H. Tupper, of the steamer *Troy* and others, states that he has been using this corrugated iron in a boiler and that he has tested it severely, having carried 150 lbs. to the square inch on an arch without a single brace upon it.

The chief points claimed for this corrugated iron are, that a boiler made ofit is much stronger for the same weight; that more heating surface is afforded in the same length or dimensions in these than those made of flat iron; that being constructed wholly without braces the danger of scale collecting around the same, as in ordinary boilers, is obviated, thus preventing deterioration of the metal from this cause; and it is cheaper to make—a boiler of this iron costing about two-thirds of one of equal heating surface constructed of plain iron; and also a great economy in point of weight is manifest. The deposit of scale and sediment, which is such a source of injury to the ordinary boilers, is also claimed to be much less in this, if not wholly prevented. The mechanical reader will see, by referring to the section of the low-pressure boiler, that the corrugations extend across the crown sheet or arch, and that the expansion and contraction of the sheets, which is always going on when the boiler is "fired-up" from one day to another, and suffered to cool, does not permit scale to adhere, as from the causes above mentioned it is dislodged as fast as formed, and may be washed out with a hose and afterward drawn out of the hand holes. The use of this iron is also a guarantee for the employment of the best quality of the metal, as in the process of manufacturing the sheets any inferiority is readily perceived and the plate rejected. The boilers of the *Isaac Newton*, recently burnt on the North River, weighed 51,448 lbs., if they had been corrugated the weight would have been 36,020 lbs.; instead of being 30 feet long they would have been 21 feet 6 inches; and in lieu of the heatingsnrface in the furnaces being 386 square feet, with corrugated iron it would have been 376 square feet. From these figures the reader will see that an obvious advantage is apparent in the use of this material. A large number of circulars, testimonials, &c., have been shown us from eminent engineers, all certifying to the value of this form of iron for all purposes where great strength, lightness and rigidity are required.

This mode of constructing boilers is the invention of Richard Montgomery, and has been secured by Letters Patent. Further information may be had by addressing Mr. Wm. A. Dodge, agent, 77 John street, New York.



MONTGOMERY'S CORRUGATED IRON BOILER.

EXPERIMENTS OF DRIVING AND OF DRAWING AIR THROUGH TUBES.

At the last meeting of the Polytechnic Association, Dr. Rowell gave an account of some instructive experiments which have been made at Hecker's flour mills, in this city, showing the different effects produced by pushing and by sucking air through tubes.

In order to separate from the wheat the shriveled kernels and other light substances, the grain is allowed to run in a thin sheet into a vertical tube near its lower end, while a strong current of air passes upward through the tube. At first the air was forced into the lower end of the tube by a centrifugal fan-blower. By this plan it was found impossible to raise the light grains more than eight feet, and unless the blast was nicely regulated some of the sound kernels would be carried over.

The fan was then placed at the upper end of the tube so as to draw the air upward. It was then found impossible to raise the light grain more than three feet; though this arrangement worked better than the first.

Then Dr. Rowell suggested to Mr. Hecker to substitute for the centrifugal blower a spiral fan, like a boy's windmill. This proved perfectly successful. The shriveled grains are drawn upward sixteen feet, not a single sound kernel is carried over, and the separation is completely effected. The centrifugal blower required a three-inch belt, but the spiral fan is driven by a belt one inch in width. The vertical tube terminates in a large square box, a round hole is cut in one side of this box, and the fan is placed just outside of the hole; the diameter of the fan being about one inch greater than that of the hole. The fan has four blades, each about five inches in width at the outer end, and about one foot in length.

On placing a thermometer at the lower end of the tube, Dr. Rowell found that the attenuation of the air reduced the temperature about five degrees.

Eight tuns of greenbacks were carried over the New Jersey railroad to Washington, one day last week. The money is said to be the collections of different Internal Revenue officers.

THE WORLD'S INDEBTEDNESS TO SCIENCE.

The fourth and last lecture of this course was given, according to appointment, on the 18th ult. The character of the lecture was much the same as those of previous ones which, it is almost needless to say, were of a high standard. Prof. Doremus paid a glowing tribute to Dr. Priestly as the discoverer of oxygen gas; and he then proceeded to state, in terse language, what an important element it was in the formation, not only of the globe itself, but of the plants and animals inhabiting it; three-fourths of our bodies, four-fifths of vegetation, and one-half of the crust of the globe being composed of this gas. So omnipresent and indispensable is it that it has been called "vital air," and its influence upon and absence from animated nature is very marked.

The economy of nature also occupied the attention of the lecturer; and he said that it was most beautiful to remark how the different processes went on without loss; for the gases respired by man, and which were noxious to his system, were taken up and absorbed by plants, to whose growth they were essential; these appropriate the carbon in the atmosphere and leave the oxygen, while man throws off the former and retains the latter. Experiments to prove that oxygen was essential to the perfect production of artificial light were then tried; these consisted, in one instance, of the introduction of ignited sulphur to a jar containing oxygen gas. In the atmosphere the combustion of the sulphur was but feebly supported; but in the presence of the pure oxygen it gave forth a brilliant light. A similar experiment with iron resulted happily. "Our bodies change every minute," said Professor Doremus, "from the action of this invisible but ubiquitous gas. I am not the same that I was a few minutes since, this audience is not the same; and, through the magic influence of oxygen, vigor is given to the intellect, power to the muscles, and vigor to the whole system." Professor Draper has beautifully said that this gas is "the cradle of the animal kingdom, but the grave of the vegetable one."

Some experiments with chlorine gas were next in order; and the effect this had on compounds of hydrogen—decomposition—was descanted on at some length; the great pecuniary value of this gas, as a bleaching and disinfecting agent was also alluded to. One instance of the value of chemistry, and especially the discovery of chlorine gas, to the commercial interests was exemplified in the fact that (as stated by the lecturer), before this gas was discovered, goods were sent from English factories to India, solely to be bleached; as the limited area and want of sunlight (which was formerly the sole reliance for producing white goods) precluded the possibility of doing it so economically at home. Nitrous oxide, about which so much has been published in the Scientific American, *pro* and *con*, was also highly spoken of as a means of producing insensibility during surgical operations; and the only objection to its use was the disgusting manner in which it was administered in general. The wonderful exhilarating qualities of