

THE STEAM BOILER EXPLOSION COMMISSION.

The President has recently sent to Congress two reports of the Commission appointed to inquire into the cause of steam boiler explosions. One of these was written and sent to the President just previous to the change of administration, but owing probably to the excitement attending the executive office at that time the report failed to reach its destination, or was overlooked somehow, and the Commission therefore forwarded a second copy of their report with that for the year ending December 31, 1877.

From these reports we learn that nearly three years have been spent in making and perfecting certain electrical instruments, by which the commission, it is said, will be able to know, at a safe distance from the boiler being experimented with, the exact condition of the water within it, as to its close contact with all parts of the heated surfaces, the exact temperature of the water and of the steam in all parts of the boiler, and also by the use of the telephone, as recently modified by the commission to adapt it to the purpose, to hear at a safe distance the sounds made by alteration of form, and by the slipping or the breaking of the stays or of the plates of the boiler. The instruments heretofore used, as stated in previous reports, proved altogether unreliable. The commission had procured all the instruments that gave the most promise, both American and foreign; but it was found impossible to obtain with them the desired knowledge of conditions within the boiler which the commission desired to have, and thought necessary to know, before a satisfactory answer could be given to the questions it was the duty of the commission to answer. The most important of these were: First, the condition of the water within the boiler as to its contact with the surfaces exposed to the action of the fire, as to its close contact or otherwise; and second, the condition of the water as to its temperature, whether it has the temperature due to the pressure or otherwise.

It has long been known, from the experiments of Leidenfrost, Klaproth, and others, that when metallic surfaces are raised to certain elevated temperatures water will not remain in close contact with them, the contact being prevented, as Professor Tyndall says, "by the recoil of molecular projectiles discharged from the water next the heated surfaces."

A committee of the Franklin Institute who had been investigating this matter found that when iron surfaces, say of a steam boiler, for instance, were raised to a temperature of about 400° Fah., the repulsion of the water was perfect.

These experiments were made with small quantities of water, at atmospheric pressure, and it was supposed that pressure would tend to raise the temperature of perfect repulsion; but experiments made since those of the Franklin Institute seem to show that pressure alone does not raise the temperature of perfect repulsion, but that this matter is governed largely by the amount or strength of the circulation within the boiler.

In relation to the temperature of the water within the boiler, the experiments of Magnus, Donny, Dufour, and others, show that water may be raised to a temperature much above that due the pressure without boiling, and that when under

these circumstances ebullition commences, the excess of heat above that due the pressure is given off explosively.

Dufour's experiments tend to show that solid matter, when present in water within a steam boiler, soon parts with its air, so that it does not prevent the abnormal heating of the water, although it has been supposed by many that the contrary was the case.

As it is believed by many investigators, Professor Tyndall among others, that these conditions of the water may cause

be re-appropriated. The commission ask that this may be done, and as the rent of grounds and the wages of the watchmen above referred to will probably require a large portion of the unexpended balance, a second appropriation of \$30,000 is asked for, in order that all needed preparation for the resumption of experiments on boilers may be made as soon as the weather is suitable. As so much money has been spent in preparing for experiments, it would hardly seem wise to drop further tests at this stage; but it would be only common

prudence to investigate the manner in which the large amount heretofore spent has been used, and then if a satisfactory showing of the expenditures is made it will be tolerably good evidence of the wisdom of making a second appropriation.

Deepening without Digging.

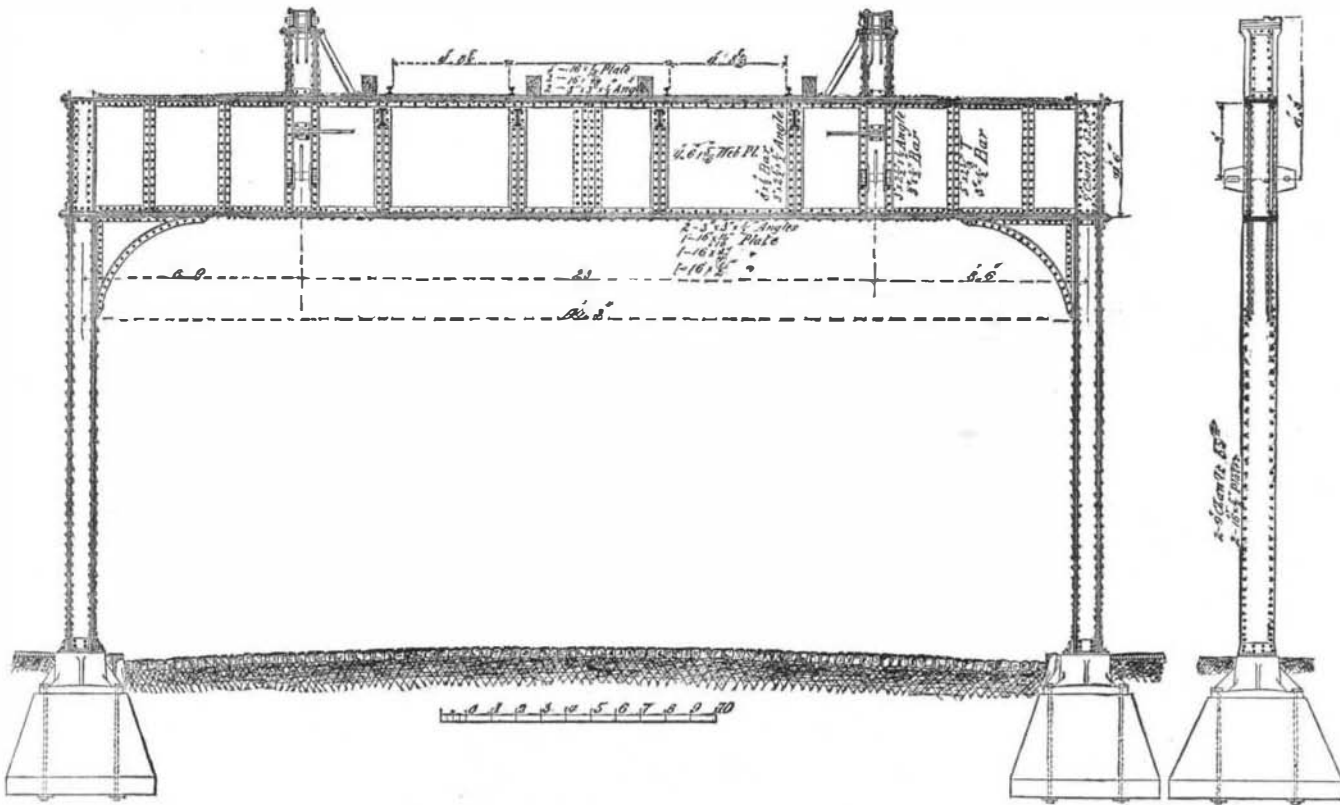
One of our mine owners recently contracted with a couple of brawny miners to sink a shaft on his claim to the depth of 100 feet. The men went to work with a vim, and at the end of a month reported the work completed and ready for inspection. The gentleman had furnished them with a rope 100 feet long for hoisting purposes, but, to have a sure thing

on the measure, he took along a tape line. On arriving at the shaft, one of the miners descended, and all of the rope reeled off of the windlass, proving that it was 100 feet deep; but to make assurance doubly sure, he fastened a stone to the end of his tape line and let it down until it paid out the same number of feet. That satisfied him, and he paid the men \$500 for their month's labor. They left for Grass Valley, Cal., and a week afterward the owner again visited the location, and made the singular discovery that the shaft had shrunk 25 feet and was only 75 feet deep. The rope had also shortened the same amount, but as there was no interested party down in the shaft to reel out 25 feet on the tape line, that article held out. Now he says that "for ways that are dark and tricks that are vain, these miners were peculiar." He figures his loss at \$125 on the 25 feet, and the price of 25 feet of brand new rope, cut off and thrown away. The boys did not work exactly with the "Golden Rule." The next men that try that game will probably listen to the old refrain, "Oh! not for Joe!" — *Eureka Sentinel.*

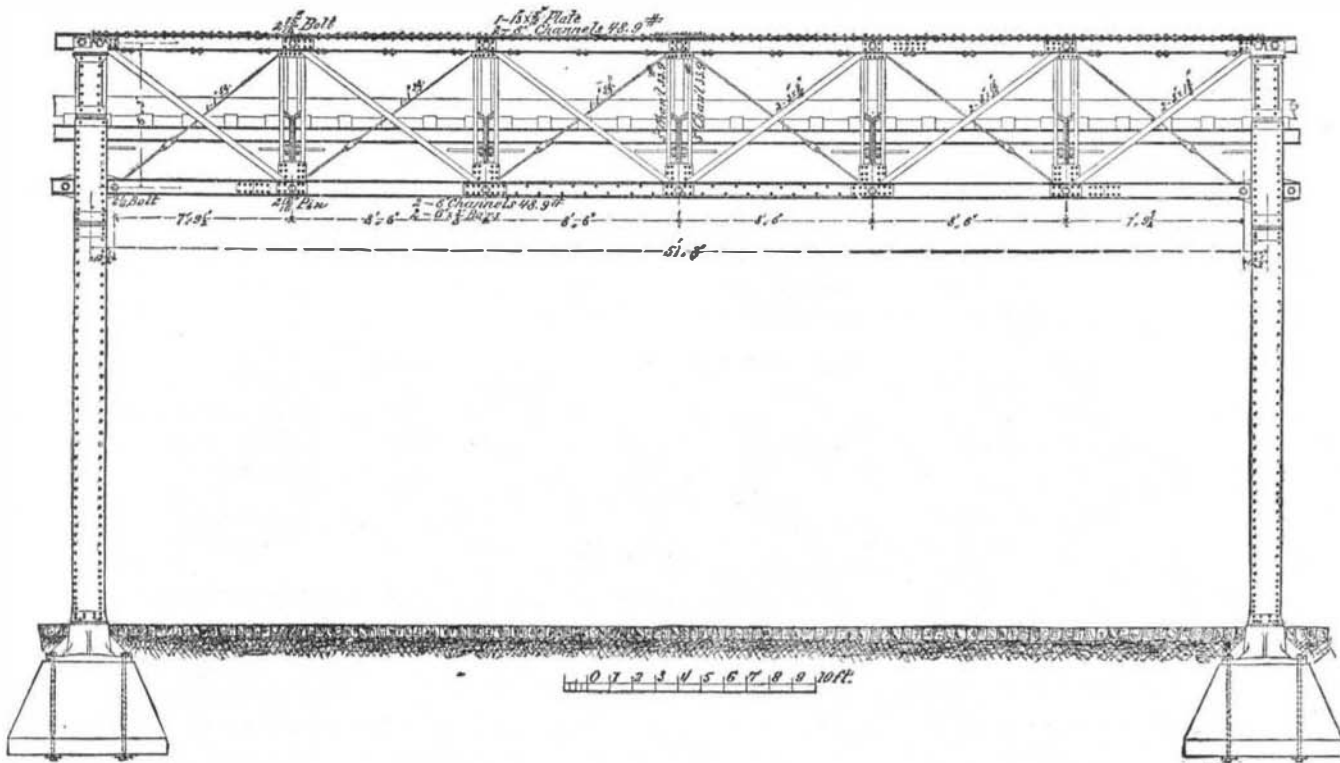
Reagent for Alcohol.

The reagent is a solution of nitrate of mercury obtained by treating the metal with a suitable proportion of nitric acid of mean strength. The action of this acid nitrate upon ethylic alcohol is rapid. If a little ammonia is added to the mixture after the reaction a black precipitate is obtained, the more intense the greater the proportion of alcohol present. Methyl alcohol and other analogous liquids behave quite differently, and do not give a black precipitate with ammonia. — *M. Jacquemart.*

GERMANY takes the third place in Europe as a producer of wool, ranking after Great Britain and Ireland, which produce about 1,360,000 cwts., annually, and Russia, the yield of which is 1,178,000 cwts. The production of France about equals that of Germany, being 618,000 cwts. Spain stands on about the same level, her crop being 570,000 cwts.



GILBERT ELEVATED RAILWAY.—Fig. 2.—[See first page.]



GILBERT ELEVATED RAILWAY.—Fig. 3.

recommence their observations and experiments with their assistance when the decision of the Secretary of the Treasury was made that the unexpended balance of the appropriation (some \$4,000) must be covered into the Treasury, so that nothing could be done with the instruments, although ready for operations.

The instruments, ground, boilers, tools, apparatus, etc., at Cambridge, Sandy Hook, and Pittsburgh are in charge of watchmen, who are serving without present pay in hopes that the balance covered into the Treasury may