

interests of the mechanics of the *Dominion* which are bound up even more immediately with our own. As before, so now, we cordially invite correspondents to give us their views on the subject, and to suggest means of improvement. We would ask them however, not to be discouraged if they are not always carried out. Many valuable suggestions reach us by this means. But on the other hand, ideas which seem highly valuable to their originators, may be in fact impracticable to us, or again we may be waiting a more fit opportunity for carrying them out. We commence this new volume in all reliance on our subscribers good will, and we wish you, as the season demands, a "Happy New Year."

#### WHY ARE NOT GOOD ENGINEERS ALWAYS SECURED?

In endeavoring to answer the above question we will state first that many of the people employing engineers will not pay the price demanded by good engineers. When a person is under the necessity of putting in an engine and boiler, either to run an elevator or to furnish power for other miscellaneous work, the important questions arise: "Will I be required to hire an engineer?" and "isn't there some way by which I can avoid paying out the amount required to hire an engineer?" There are many plans resorted to under these circumstances by persons who look upon the amount spent upon engineers as money thrown away, and never consider the safety of their lives and property. The person owning the engine and boiler goes to the inspector or examiner of engineers, and states his case. He is told that he is allowed to have a fireman, but either the proprietor or some one about the place must pass examination as engineer. The proprietor, who used to be around machinery somewhat, and understands a little about the management of steam, concludes to be examined; so he submits to being questioned by the examiner, who is very lenient (for reasons best known to those who have been there,) and finally declares the gentleman proficient as an engineer. The certificate or license is made out, and a fireman hired at \$1.25 or \$1.50 per day. He receives a few instructions from his employer in regard to his duties, and is left with the injunction "that if any one calls to see the engineer, he (the employer) is to be called at once." Sometimes the fireman does not see his employer, the engineer, for a week at a time, so he is virtually the engineer in charge of the engine and boiler.

We have known men of this class who were fully competent to manage steam machinery, even more so than their employers, who had the license of an engineer; but such is not the majority of instances.

In a shop not a thousand miles from New York, the boiler is in charge of a blacksmith's helper. One day he became very much confused by drinking too strong tea at dinner time. In the course of the afternoon one of the workmen in the shop discovered water flowing from the ash pit, which, upon examination, proved to come from one of the boiler seams. The gauge cocks were tried, and no water could be found. The result was that the fire had to be drawn, and the boiler makers had a job for a week in repairing the overheated boiler; the shop standing idle in the meantime. When all was ready to start the same man was again put in charge, with the injunction that he would be discharged at once if he ever became intoxicated again. The employer says John is a good fellow when he is sober, and he never got into difficulty before; when the real truth is John fills the place of engineer and runs an 80 H.-P. engine at \$1.50 per day. If a good, practical engineer was hired, he would have to be paid \$2.50 to \$3 per day.

A short time ago a firm advertised for an engineer, and among the other applicants for the situation a strictly first-class engineer answered the advertisement.

He was kept nearly three hours waiting in the office before he could see the employer, who did not seem to be uncommonly busy.

Just as the latter was ready to go home, he asked the engineer if he could run a lathe. The answer being in the affirmative, he was told that an engineer to fill the position in their concern "would be required to wheel his own coal and ashes, do his own firing and make his own repairs, not only upon the engine, but about the place at night and on Sundays, for which no extra time would be allowed." Besides this he was to run a lathe near the engine-room door. To do all this would require

the engineer to get to the place at 5.30 in the morning, and leave at 7 in the evening.

For all this service the sum of \$10 per week was to be paid. If under these circumstances the engineer, being overcome by fatigue, had fallen asleep and an explosion had been the result, would he have been to blame? He would have had to shoulder all the blame.

A vender of patent damper regulators stepped into a factory not long since and solicited an order. The proprietor observed that it was no use to go into any expense in that direction, for, said he, "I recently bought a set of oil cups for my shafting, so that it would require little or no attention, except refilling the cups every two or three months. One day, upon inquiry, the engineer told me they had been taken off because they would not work, so I think that anything of a scientific nature is of small use, and the money expended for such things is worse than thrown away. The fact is, the fellow did not understand those cups, and his head was so thick that I could not beat it into him." This is the office side of the circumstance. Let us take a look at the engineer, who is paid the enormous salary of \$9 a week, and is on the verge of quitting, because the manufacturer across the way has offered him \$10 a week, and will have all his coal wheeled to the fire room. We find that he is expected to make himself generally useful about the place, and it is regarded as the least important of his duties to run the engine. It is the exception, when a competent engineer can be procured at such miserly pay. A mechanic in the shop has nothing to divert his mind from his work, and when his eight or ten hours work is done he goes home, while the engineer has a stuffing-box to pack, a joint to make in some pipe, flues to sweep, shafting to put up, and on Sunday has to clean out the boiler, besides doing other work which must be attended to while there is no steam in the boiler. The only remedy for such practices is proper legislation and a strict enforcement of the laws. It has come to such a pass at the present day, that if a majority of the jury in trying persons censured for boiler explosions either own or are interested in using steam boilers, the whole case is quietly dropped by unanimous consent (so said.) On the other hand, owners of boilers are often censured for the carelessness or ignorance of their engineer, who they hire to take care of their engine and boiler, and are required to suffer loss of money and reputation thereby. So long as gross corruption among those who are selected to administer the law is condoned by the public, so long we shall have boiler explosions in abundance, and other lamentable accidents attending the use of steam.—*Am. Machinist.*

#### ELECTRICITY IN STEAM BOILERS.

A correspondent of the *American Machinist* says, experiments made a few years ago by some of our scientific men on the question of electricity in steam boilers clearly demonstrated that a steam boiler not only generates steam, but also electricity, the quantity of which is governed by the purity of the feed water. The discovery was made accidentally. The safety-valve of a steam boiler was blowing off, and the fireman, attempting to press the lever down with one hand while the other was in the escaping steam, felt as his hand approached the lever a strong shock and saw a spark. Mr. Armstrong having been informed of the fact made some experiments on different kinds of boilers, and found that escaping steam was charged with positive and the boiler with negative electricity, and that the generation of the spark was due to the friction of the globules of steam striking against any obstructions. He also further found, with the assistance of Faraday, that steam of water containing some fatty matters, as acid, showed no trace of electricity. Now, according to the experiments of a Belgian engineer on the same subject, it is found that steam of water, as commonly used in boilers, will generate an electrical spark when discharged against a red-hot or even dark-warm iron rod. The theory of the friction of the globules of steam applies well to the bursting of steam pipes, whose cold surface the steam strikes on entering the pipes, which, if charged with electricity, will generate the spark to ignite the explosive gases the pipes may contain or that has preceded the steam from the boiler. It is strange that a boiler which is in good condition, having but fifty pounds steam pressure, the water height all right, and everything in good working order, the damper closed for the dinner hour, upon starting up should all at once explode. There must be some unmeasured agent to ignite this gas, as the steam pressure could never cause such disaster. Some explosive gas is the agent; but the electrical spark is the generator.