

manufacturing concern in Ontario and found a man filling the position of engineer who told me he knew nothing about the work. The engineer had left some time before, and he was driving the team when the boss came out and ordered him to go in and take charge of the boilers and engine. He said he knew that if he refused he would be discharged, he had a wife and family at home depending on his weekly earnings for bread, I could see the fix he would be in. He told me he knew nothing of the work he was doing, and when I asked him how often he washed out, he did not appear to understand what I meant. Is it any wonder that explosions occur when such a state of things is allowed to exist?

The law which was before the Ontario legislature three years ago would have passed had it not been for the opposition it met with from members from the saw mill districts, many of whom owned mills and were afraid they would have to pay 25 cents a day more for their engineer, and these are the very men who need licensed engineers most, judging by the number of explosions which occur in saw mills.

In conclusion, I trust that success may attend your efforts in establishing the C. A. S. E. in Guelph, and even though you may be small in number, you are banded together for a good cause, and you can rely on it that the right hand of fellowship will always be extended to you by the members of the different associations.

A vote of thanks was tendered to Bro. Edkins by the President for the address, to which he suitably replied.

Guelph No. 6 is composed of a good lot of fellows who are all practical engineers. Their officers are the right men in the right place. In fact, all the officers and members seem to have plenty of "go" in them, and Guelph No. 6 starts out with every prospect of a long and useful career.

Bro. Edkins was made an honorary member.

CARE OF STEAM BOILERS.

Editor ELECTRICAL NEWS.

LONDON, ONT., Nov. 20, 1892.

SIR,—In the November issue of the ELECTRICAL NEWS you published a paper on "Care of Steam Boilers," by Mr. Albert E. Edkins. I would like to make a few remarks on this very important subject through your columns, as I believe, as stated by Mr. Edkins, that this matter does not receive the careful consideration that it should.

With the knowledge at hand there is absolutely no reason for boilers to explode. There are reliable safety valves; there are reliable fusible plugs, and there are reliable engineers to take charge of them, and what is more, expert inspectors can be secured to inspect boilers at a very reasonable charge.

In the last 40 years the alterations made have not been very great, though they have been important. In the structure of the boiler itself the chief alterations have been in the direction of providing against expansion stresses due to the action of heat upon different portions of the boiler causing differential movements. In details, there have been improvements in the riveting and in the making of the rivet holes.

I regret to say there are still too many architects who provide the worst part of a building for the steam plant unless they are expressly enjoined otherwise. Now, right here is where the employer makes a great mistake. If, instead of an architect, he would consult some first class engineer as to where the steam plant should be put, how much room should be required for it, and how the brick work should be built, he would find that the life of the boiler would be a great deal longer, and there would be considerable saving on the coal bill.

An employer called on the writer a short time ago and wanted to know the reason why his new brick chimney would not give satisfaction. He stated that although he employed a first-class architect and bricklayers, results from the new chimney were not as good as from the old iron one—in fact, the steam could not be kept up the draught was so bad.

When asked the details, he said: "The boiler is a 35 H. P., the chimney is 4 ft. square at base inside and 3½ ft. square at the top of the flue, and the height is 60 ft. from surface."

Would it not have paid this man to engage a first-class engineer in the first place, in which case he would have had a first-class job, whereas as it is he knows not where the expense is going to end.

This is only one instance. A furnace under a boiler into which I looked the other day, as the fireman was shovelling in the coal, might be compared to an old street car open at both ends. Some good consulting engineer would strike quite a harvest if he could be allowed half the saving he could make in the coal bill. The so-called engineer in charge of this plant boasted to me that it was the finest bricked in boiler he ever handled.

He said: "I can blow her off, wash out and fill her up again (with water at 50 F.), and then have enough heat left in the brickwork to raise steam to 10 lbs. without any fire."

Now, the city has a by-law in force, and faithfully carried out, which provides that only a small quantity of gunpowder can be kept in or around a store. My opinion is that such steam plants as the above mentioned should be classed as gunpowder in large quantities and should be taken out to some lonely spot in the country, where the "engineer" could be given a fair chance to show his abilities. Still, were such a boiler to explode, some people would think it was a pure accident.

It is high time that an engineers' license and boiler inspection law was in force and faithfully applied. I must say that much credit is due to the Boiler Inspection and Insurance Co., of Toronto, for the able manner in which their inspectors have given safety by inspection and a word or two of good advice to the engineers of this city. I know steam gauges now telling the truth, which were 5 and 10 lbs. out before inspection, and safety valves made good which were absolutely useless. In this direction we ought to set out with the conviction that a boiler is not an article to explode.

FRED. G. MITCHELL.

POWER TO RUN A DYNAMO.

By J. H. GLOVER.

ONE of the most remarkable things about the dynamo-electric machine is its power-absorbing capacity.

It is well known that in operating a mechanical device it requires less power to keep the apparatus in motion after it has been started than it does to start it. In the case of the locomotive, for instance, it requires very little steam to keep the machine in motion after it has started, but it requires great power to start it from the condition of rest. The same applies to electric cars and all other vehicles, as well as machinery. In all, the greatest power is needed to effect the start, after which little power will maintain the motion. Not so with the armature of a dynamo, however, which in its mechanical aspect is no different to any other piece of mechanism.

Naturally, the uninitiated would suppose the armature would run with great facility after it had got started, just as the locomotive does, but exactly the reverse is the case, and it is a remarkable fact that the faster the armature is revolved the greater is the power required to maintain the motion.

The armature of a gigantic 500 H. P. generator may be turned by the hand from a state of rest, so delicately is it balanced, but to run it at a speed of several hundred revolutions a minute requires the energy of a steam engine of great power, and within certain limits the faster we run the armature the more steam power will be required.

Now, what is the reason for this apparent anomaly in mechanics? It is this. When the armature is at rest there exists no magnetic field, the existence of which depends upon the motion of the armature, and the faster we run the armature the denser will the magnetic field become. The elements of the magnetic field consist of what are ordinarily termed "lines of force," and when we speak of a dense magnetic field, it is another way of saying that there are a great number of "lines of force." One of the peculiar properties of the magnetic "lines of force" is that they tend to arrest motion, and in the case of the dynamo the tendency always is to stop the motion of the armature in its revolutions. It is evident, therefore, that the stronger the magnetic field, and consequently the greater number of "lines of force," the greater will be the tendency to arrest motion, hence the greater will be the power necessary to overcome the retarding influence of the field. — *Electrical Age*.

Mr. W. A. Grant, formerly secretary to Mr. Van Horne, President of the C. P. R., has been appointed manager of the Niagara Falls Electric Railway, and will enter upon his duties at once. The railway, however, will not go into operation until the spring.

The Back River Power Co., Ltd., is applying for incorporation at Montreal. Its capital stock is to be \$200,000. The applicants are.—John Thomas Wilson, merchant, James Robert Walker, merchant, Gilman Cheney, gentleman; Evans Fisher Ames, manufacturer, and Frederick Milton Cole, insurance agent. The object of the company is to lease or sell water power or electric power to individuals, companies or municipal corporations.