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MAN-HOLES AND SAFETY VALVES.

The Boiler Insurance Company, of Manchester, England, whose proceedings we so often notice, because they are doing a good work, have made a monthly report from which we extract certain parts of interest to our readers.

In the course of certain investigations, in a recent catastrophe, they discovered that the seat of the disaster was the man-hole. The boiler itself was quite a small affair, being only five feet and three inches high, two feet and four inches diameter, composed of plates one-fourth of an inch in thickness. The pressure carried was eighty pounds to the square inch, and the boiler was warranted for one hundred and fifty pounds.

The boiler failed at the man-hole, which was without any saddle or casting to strengthen it. The vents were three in number, diverging like cracks in a pane of glass, one running round a seam of rivets, and completely stripping off the external shell, which was blown into fragments.

The jury, who were probably instructed before, had brought a verdict that the explosion was caused by the absence of the saddle plate or casting which is to be found on all properly-made boilers. The boiler in question was only six months old.

In addition to the bad construction of this boiler, as regards the omission alluded to, the jury called attention to the dangerous character of the safety valve. This was a small valve 1½ inches in diameter, loaded by a spiral spring in such a manner that it was equal to a percussion cap in a charged shell, or in other words, was so utterly unreliable as to be worse than no valve, as will be seen from the following details:—

The spring that held the valve was checked at the top by a yoke which passed over two standing bolts—one on each side of the seat. This yoke was secured by nuts, and no provision existed for regulating the tension of the spring so that the amount of pressure could be known. It was found that one turn of the nuts would increase the pressure from 80 to 150 pounds. Moreover, the spring was of so stubborn a character that at the point of blowing off, the steam barely wheezed through without raising the valve perceptibly. This valve, and the error of cutting a large hole in the boiler for the man-hole plate, was the cause of the "accident."

We have repeatedly shown, by argument, by facts, and by illustration, that vague and unsound theories concerning boiler explosions are of no value whatever in ascertaining the cause. Men committed

to certain views go prepared and indeed eager to find something in the accident to corroborate their assertions, and they generally succeed in so mystifying the matter, if called upon to testify in court, that neither they nor the jury have the slightest idea what they are talking about.

But let a practical man go and look for evidences of weakness, for proofs that the boiler has been misused, or badly constructed, and he will find natural causes for the explosion. The safe load of a boiler plate, per square inch of section, has been ascertained; why then not take that as a starting point for investigation? Or, if this be proven correct, there are the many faults of construction, which tend to weaken a steam boiler, that practical men know exactly where to look for.

One great trouble stands in the way of a full and impartial verdict in such cases. If a jury of practical men be impaneled, they are tradesmen themselves, and are naturally bound by trade ties to keep trade defects secret. If John Smith judges of his neighbor's boiler as he should, and condemns it because it was chisel-cut in caulking, because it was badly braced, because it was made of thinner iron than the laws which govern the strength of materials demand, he knows not how soon his turn may come, and he be the prisoner at the bar instead of "the intelligent jury." It is, therefore, not at all strange that so many men of sound common sense, who say in private what they cannot say in a verdict, lend a willing ear to the voices of those who sing of ozone, of electric influences, of the decomposition of water, and other obsolete theories.

It is not a matter of any man's "opinion" how much pressure a boiler will stand. It is a question of the strength of materials. The plan of cutting a huge piece out of a boiler, without adding any protection to it, is manifestly an error that we believe is little practiced in this country; and as for the safety valve, experience shows that the lever and weight is entirely reliable when properly made and cared for.

BUILDING OF ROADS FOR COMMON TRAVEL.

The usual custom of making roads by covering a substratum of common soil, sand, or even turf, with coarse gravel left loosely on the surface, is one which is anything but economical or wise. A prolonged storm—occasionally a violent shower—gullies the roadway, washing off the gravel, and leaving treacherous mud holes. Even where broken stone is used upon a proper foundation, it is left to be consolidated and compressed by the wheels of vehicles and the hoofs of horses. The tax upon both horses and carriages from this cause is a severe one. It is a vexation and a hindrance to the traveler. Again, the roadside is left in such a state that in a rain, or at the melting of snows, pools form and ultimately wash across the roadway, making chasms dangerous to cross and expensive to repair.

While so much is said in favor of permanent ways for steam transportation, it would be well to give some attention to the subject of improving our common roads and streets. It can be easily demonstrated that, on poorly constructed roads, the expense of keeping them in repair so they will be in proper passable condition, is greater than the additional cost of building the road at first in a correct manner. It is unnecessary to speak now of the foundation of a good road. That is a matter that may be considered at some future time. The surface is the portion to which we wish to direct particular attention. Where proper stone for breaking is not readily attainable, and the cost of preparing it is too great to be incurred, gravel, measurably free from soil and sand, is the best substitute for a roadway surface. But spreading this material, however thickly, over the foundation is not making a road. A bed of loose gravel or broken stone is a poor way for horses and carriages. But just consolidate this material by compression, and the nature of it appears to be changed. The yielding, treacherous surface, which gives no reliable fulcrum for the horse's feet, becomes a firm floor over which the carriage or heavily-loaded team rolls smoothly, and on which the horse moves with a much less expenditure of muscular exertion.

The plan of rolling the roadways is now largely adopted in England and France. For this purpose,

in England, rollers are used of ten and twelve tons weight, drawn either by horses or traction engines. In France they use a roller with locomotive attached, having a power of about ten horses. The result is to consolidate and solidify the material, until, although greatly differing from an unyielding surface, it is sufficiently homogeneous and enduring to resist the action of the elements and the wear of travel. Undoubtedly immense rollers carrying the weight of engine and boilers are the most effectual, yet we cannot see why rollers capable of being drawn by a team of horses might not be advantageously employed on our common roads in more than one stage of the process of road-building, but especially in finishing the surface. The cost of the rollers could not be very great, and it would soon be saved in the lessened expense for repairs. Roads in the country are generally made and repaired by the towns, or at the expense of the counties, under the direction of county commissioners. Let each town, or the commissioners, provide suitable rollers at convenient points to use on different sections of the roads, and although the first cost of road construction might be somewhat enhanced, the after repairs could be easily and cheaply effected when required, which would not be so frequently as now.

CANADIAN PATENTS.

In another column our readers will find an article upon the above topic, copied from the *Quebec Gazette*, which sets forth that the Canadian Parliament is seriously considering the policy of relaxing somewhat their present exclusive or one-sided patent system.

The editor truly says: "This is a sort of stock subject, which comes up session after session," but hitherto without success. American inventors wishing to secure their inventions from wholesale piracy in the Canadas, have been tantalized, year after year, with hopes of speedy reform, which would enable them to protect their rights in those Provinces; but the hope has been deferred from year to year, until the delay seemed likely to wear out human expectation.

We would not be premature in the matter, but trust we shall soon be able to announce that our citizens can secure their just patent rights in Canada.

The *Gazette* admits that the Canadians have pirated our inventions, but as an off-set, hints very strongly that our people have stolen some inventions from Canada—which is possible, though it seems hardly probable. We will, however, consent to square accounts on this point, if our non-reciprocal neighbors will only hurry up their scheme of relaxation so as to admit Americans, Frenchmen, and Chinese to patent-right privileges.

A Theory in Regard to Rinderpest, Pleuro-Pneumonia and Cholera.

A communication has been received at the Department of State, from our legation at London, inclosing two pamphlets relating to certain experiments by Dr. James Dewor, of Kirkcaldy, Scotland, for testing the efficacy of sulphurous acid gas as a disinfectant. Results are cited which lead to the conviction that the diseases—cholera, rinderpest, pleuro-pneumonia, and others—may be not only very much modified, but even wholly prevented by this means.

The method of generating the gas is very simple and inexpensive. It is only necessary to have a chaffer of red-hot cinders. Set a small crucible into them and drop a piece of sulphurstick about as large as a man's thumb into it. This will fumigate a large cattle shed in twenty minutes.

The animals seem to enjoy it, and it acts as a tonic on man and beast. The shed must be well ventilated during the fumigation, as well before as after it, and sanitary rules must be enforced in regard to cleanliness, removal of dung heaps, etc. During the prevalence of such epidemics as are above named, the fumigation may be made according to the foregoing directions four or five times a day; and not only is this treatment said to cure these diseases, but it is stated that mange, ringworm, and lice have also vanished before it, and that grease heels in horses have also been cured by it, while severe cases of phthisis and tubercular affections of the lungs have also been relieved in human beings.