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WHAT CAN BE DONE FOR INVENTORS—ADVICE GRATIS AND ADVICE FOR PAY.

For the information of our new subscribers, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and contemplating securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. By having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a model or drawing and a description of the invention should accompany the remittance.

The publishers of this paper have been engaged in procuring patents for the past SEVENTEEN years, during which time they have acted as Attorneys for more than TWENTY THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application. We also publish a large pamphlet containing the PATENT LAWS of the United States with a digest of facts relative to the rights of inventors and assignees. This pamphlet is important to every person who owns a patent or is about to apply for one. Sent by mail on receipt of six cents.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address

MUNN & Co.,
No. 37 Park Row, New York.

A GRAND CONTINENTAL RAILROAD.

We have a railroad system, so far as the engines and cars running upon rails is concerned, but as it relates to uniformity in the character of our railroads, there is a decided want of system. In the construction of machines and articles for public use, every

sensible manufacturing company adapts machinery to form the separate parts of their productions, so as to obtain exact duplicates, in order that new parts may at any time be fitted. The railroad companies existing in different States have not exhibited this wise disposition in the construction of their several lines. In the Atlantic and several of the interior States, the narrow gage of 4 feet 8½ inches width prevails, excepting the New York and Erie Railroad, which is a magnificent six-foot track. In Ohio the gage is 4 feet 10 inches, and in several other States there are five-foot gages. In consequence of this want of uniformity in our railroads, special locomotives and cars are required for each gage, hence we have no general railroad, and a change of cars is required wherever the harlequin gages conflict. We have advocated a uniform system of tracks so as to secure a grand national highway on the rail, from the Atlantic to the Pacific. The grandeur and benefits likely to result from such a continental highway have been comprehended by one company, at least, and measures have been in active progress during the past two years to carry them out upon a scale which excites universal admiration. The object in view is the completion of a grand trunk line of the six-foot gage, extending from the Hudson river to the Mississippi river, opposite St. Louis; and from thence it was hoped the same broad track would at some future day be carried to San Francisco. The Atlantic and Great Western Railroad, now under the course of construction, is a continuation of the New York and Erie. It forms a junction with it at Salamanca, 416 miles west of New York, then proceeds through Jamestown, N. Y., into Pennsylvania, passing through Meadville, thence into Ohio going through Ravenna, and Akron to Dayton, to connect with the St. Louis Railroad, forming a line 1,200 miles in length of a continuous six-foot gage. This railroad was commenced in 1860, and sixty miles of it was constructed in May 1861, when it was suspended for some months. It has since then been completed to Akron, and was lately opened to that place. Upon that occasion, Wm. Reynolds, Esq., President of the Pennsylvania division, stated that in the short period of seven months the means had been furnished and the work virtually completed on 205 miles of railway, on nearly all of which distance, on the first of June last, not a shovel-ful of earth had been turned. This was a rapidity of construction unprecedented in railway history, and was the more remarkable as no portion of the work was sub-contracted, but was carried forward under the personal superintendence of the Engineer-in-Chief, T. W. Kennard, Esq. The magnitude of the work can be appreciated when it is remembered that it required nearly one mile of railroad to be constructed daily. About a year ago, we gave a description of some locomotives that were being built for this road at Paterson, N. J. Now there are 30 first-class engines and 340 cars running on it; and 30 new locomotives and 700 cars for it are in the course of construction. Every foot of such a railway adds to the solid wealth of our country, and in these dark days of war and trouble, the construction of such a railroad excites our wonder and commands our admiration. In expressing such an opinion we wish it to be distinctly understood that we are not the advocates of any special gage. We regret to state, however, that President Lincoln, in conformity with the power conferred upon him by the Act of Congress, has decided that five feet shall be the gage of the Pacific Railroad. This will break up the uniformity of gage for a great national highway, upon which the silks and the teas of the Orient could be carried from the Pacific to the Atlantic without a change of cars. The advantages of a uniform gage to form a grand continental highway, it seems to us, should be palpable to every one. It affords us pleasure to notice that our cotemporary, *The Railroad Record*, entertains similar views. This is not a question that should be controlled by minikin local interest and dwarfish views. It is a national question of vast importance, and should be decided upon national principles. We trust the President will reconsider this subject; for, upon mature reflection, we think he must decide for a uniform gage on the Pacific Railroad, which, when completed, will, in connection with the Atlantic and Great Western line, form the most magnificent railroad on this globe.

IS YOUR BOILER SAFE?

Every manufacturer, and every corporated body employing steam as a motive power, is immediately and directly interested in this question. In cities, particularly in the business part, the use of steam power is very general, and almost every square rod has its separate boiler. In view of this fact it behooves the merchants, capitalists, mechanics and engineers owning or in charge of these boilers to see that they are always in as good order as they can be put. Experience has demonstrated the fact that very many boilers are not only out of repair but totally unfit to be used at the pressure at which they are commonly worked; and not only is this a fact, but it is also true that these boilers have become so by carelessness and neglect. Without going further into this part of the question, let us see what can be done to avert the evil. Boiler explosions are continually occurring, and so far from being solved as to the cause of them, remain as inscrutable as ever. While we cannot say, in every case, what the origin of disaster has been, we may at least avert the possibility of danger by paying some attention to the primary principles of boiler preservation. In the first instance, steam boilers are too often neglected. Many engine-drivers know little as to how the boilers are constructed or internally arranged, and being ignorant, of course they are incapable of giving the boilers proper attention. If manufacturers will continue to employ such persons, when there is plenty of skilled labor in the market, they and the public must abide by the consequences. We cannot do better in this article than to advert briefly to some of the causes which operate disastrously in steam boilers.

Steam is generated from water; it is pumped in for that purpose. Too much water wastes coal, too little burns the boiler; the golden mean should be observed in all cases. The height of water in the boiler, measured by the gage-cocks, depends upon their distance from the crown sheet. In general the boiler-makers insert the first one at from four to six inches over the crown sheet of the furnace, the second one six inches above the first, and the third one at a like distance; thus water issuing from the third gage-cock indicates that there is eighteen inches of water on the crown sheet. This amount is never, or at least should not be, carried in the boiler, as it is useless and wasteful, provided the tubes or flues are in the proper place. Keep the water, as a general rule, between the first and second gages, or as engineers call it "scant two," and the best results will be obtained. On trying the water do not pull the handle of the cock round with a jerk; that may indicate a contempt of the force of steam, and be very knowing, but it is very bad practice. Open the cock gently and partially, so that only a slight aperture will be presented for the rush of the steam and water, and the actual amount of water in the boiler will be indicated. Steam naturally seeks an outlet; when the gage cock is opened suddenly the steam raises the water to the opening, and does not, therefore, give a true exhibit of the water line.

There are, however, other things equally as important as the quantity of water in the management of steam boilers, and these we will consider. Let us examine the braces and their relation to the work required of them. Take off the manhole plate, and get in the boiler. It is a good plan to do this once in a lifetime at least, as we can then fix the general appearance in our minds. Take a flat chisel or a small iron bar and sound the braces; possibly some will ring like a bell, while others vibrate slowly, like a loosened cord; take out the latter and shorten them, they are too slack. See to the jaws of all the braces that they be not split or cracked; take out all those braces which are worn thin by rust or the action of scale or deposit; in a word, set them up to their work. In some boilers there are not braces enough. The crown sheet, particularly, is weak when it is flat, and requires the most consideration. Ascertain the pressure of steam on your boiler, divide the area of the crown sheet into inches, multiply the inches by the pressure, and you have the weight in pounds which the furnace top has to sustain. Reduce the pounds to tons and you will have some adequate conception of the crushing force on a fire-box roof. Look also if there be scale forming on the flues or