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O. D. MUNN, S. H. WALES, A. E. BEACHE.

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AGRICULTURAL STEAM ENGINES.

Many modern improvements in mechanism have greatly multiplied production and economized human labor. Thus, by the labor of one person with the sewing machine, twenty stitches can be executed in the same space of time as one stitch by hand, and labor-saving results fully as great, have been effected by the spinning-frame and several other machines. But the chief feature of mechanical improvement consists in the application of new powers as substitutes for manual labor. The soil, for example, may be cultivated as well with the spade as the plow; but with the latter, drawn by two horses, labor nearly equal to that of twenty men is performed; hence it economizes human toil to this extent. Grain can be cut as well with the cradle-scythe as with a reaping machine; but with the latter, operated by animals, human toil is economized to an extent equal to that effected by the plow. A step still higher in the application of mechanism, is its adaptation to be driven by water power. The torrent, leaping over the rock, is applied to grind our grain, saw our lumber, and weave our cloth. But higher and greater than these two powers, is that of steam applied to mechanism. It is not confined to certain localities, like water, and its concentrated energy enables man to achieve results more resembling the feats of the fabled Titan's than those of human beings. In the steamship the power of three thousand horses is exerted in a very limited space, to drive the vessel across the ocean; while, on land, a locomotive, drawing a common express train, exerts a power exceeding that of three hundred horses. Steam is the most economical, versatile, and potential power ever brought into the service of man. It has been estimated that the steam power of the world now exceeds that of three times the adult male population of the globe. We believe this is not an exaggerated statement; and it affords some idea of the vast productive powers which are subject to the will of man. But although it has been applied to drive almost all kinds of machinery, there are several departments of industry in which it is scarcely used at all. The most extensive of these is agriculture, in which steam power has not hitherto been required to any extent, because animal labor has been so abundant and comparatively cheap, in the rural districts. But it appears to us that a time is approaching when many of our large farmers will be compelled to turn their attention to steam power, for performing many operations on the farm. It has been calculated that the present war has devoured about one hundred thousand horses and mules; and perhaps as many more will perish before the contest is ended. In many parts of Virginia, Maryland, Kentucky, Tennessee, and Missouri, and in some sections of Pennsylvania, Ohio and Indiana, the farmers have had all their laboring cattle swept away; and their farms cannot be cultivated without such animals or some substitutes for them. Necessity, therefore, may compel many farmers to apply steam engines as partial substitutes for the animal power of which they have been deprived. This is a subject to which their attention and that of steam engine manufacturers should now be directed. When it can be used with economy, a steam engine is preferable to horse power. When an engine accomplishes the day's labor, it requires no further attention; and, when not work-

ing, it consumes no food, and needs no attendant. Farm engines should be simple and strong, and there is undoubtedly much room for improvement in their construction, so far as relates to securing economy of fuel. The energy of one pound of coal under combustion is equal to 6,000,000 pounds lifted one foot; but the work performed by common portable engines, of about ten-horse power, is only about 495,000 pounds, lifted one foot, with a pound of coal. It is possible to build a portable engine for farmers which will exert a horse power for each two pounds of coal consumed per hour; but engine builders must take a considerable step forward in the way of making improvements before they secure such economical results.

A MOST SENSIBLE JURY.

We have read with great pleasure the report of a jury recently impaneled in the city of Lowell, Mass., to hold an inquest on the body of a person who was killed by the explosion of a steam boiler in that place. These gentlemen, without befogging themselves with so-called "scientific" discoveries, went straight to the fountain-head of the disease that causes so many boiler explosions—carelessness—and their finding was as follows:—"The jury find that the cause of the explosion was not from a lack of water, but by a pressure of steam greater than the boiler was intended to bear, or was necessary for driving the engine and machinery; and that this excess of pressure was owing to a want of care required by the kind of fuel used, and to the incompetency, from ignorance, of the person in charge of the boiler. And the jury also find that the steam-gage and safety-valve did not indicate the amount of pressure on the boiler; but were so mismanaged and out of order as to be wholly untrustworthy. And the jury also find that it was the practice of the engineer to leave the boiler, to do other work away from, and out of sight of the boiler, and for longer periods of time than was consistent with a proper care and management of the same. The jury are of the opinion that the too prevalent practice of employing, from motives of economy, inexperienced and otherwise incompetent persons to have charge of steam-boilers, is one almost sure to be attended with calamitous results, and calls for legislative action."

There are at this very moment, in this city, numberless establishments where the very same practice is carried on, that is—hiring an engine-driver, and compelling him to do other work in the intervals of firing. Where such a course does not result in immediate disaster, or a sudden explosion, it is sure to occasion a most wanton waste to the proprietor's property.

It is unnecessary to say that no thorough-bred engineer would ever engage himself to do the duties which are required of many engine-drivers: between the two terms there is a vast difference. Employers would consult their own interests more effectually by hiring every person to fulfill some specific duty with which he was familiar, and not engage men who are known as "Jack at all trades, but master of none." It is as much as most individuals can do to master a standard trade in a lifetime; and the lives and property of the community ought not to be put in jeopardy by the avarice or carelessness of a few.

CONSTRUCTION AND REPAIR.

The life of a machine depends measurably upon two things—its construction, and the usage to which it is subjected; all others are subordinate. Admitting this, it is palpable that the better a machine is made, the greater credit will belong to those who constructed it. But in sending away machines from the workshop as finished, mistakes and oversights are sometimes committed, that rebound injuriously to the maker's reputation. Theoretically, the mechanical minutiae of the best locomotives present a model which should be emulated, and copied into other forms of mechanism all over the land. To be explicit—the closely and accurately-fitted gibs and keys in the connecting rods of locomotive engines, the neat manner in which the brasses are fitted to their several places, the tight joints, the reamed holes, and steady pins, in addition to the security derived from screw bolts, for preventing parts from shifting out of line with each other, should be more generally adopted as mechanical practice than it is. Of

course, all machinery will wear out, sooner or later. Every tool has its allotted period of service; but the time of its utility may be very much lengthened by the manner in which it is put together. Cheap tools are not always cheap. They may be sold at a low price, but they are continually breaking down, and require renewing so often that the outlay upon them in a short time equals the value of a first-class article. Tools to be cheap must be well made; then they will last for years at a small expense for repair. Our steam fire engines have been praised in England, on account of their superior finish, and general excellence of workmanship; but those sent out were not by any means the finest we have, being only a sample; the "Manhattan" in particular having been in constant use nearly four years. We cite this fact as going to show the attention everywhere paid to good workmanship; and the important bearing it has upon the reputation of the maker, and the performances of the machines themselves.

We have been sorry to remark, in some parts of the country, a general inattention to the well-established mechanical laws and rules (not scientific, but practical ones); as, for instance, putting a $\frac{1}{2}$ bolt into an $\frac{1}{4}$ th hole; drilling holes too large which were to be tapped; putting rough bolts into reamed holes; using threads of too coarse pitch, and similar acts, professionally improper and irregular, which should not occur. We make these remarks in no captious spirit, but with an earnest desire to see our manufacturers, all over the country, avail themselves of the skill and improvements of others; believing that by so doing they will in the most direct manner serve their own interests.

THE COAL QUESTION.

Some facts bearing on this subject are difficult to account for, when reasoning by the laws which are usually supposed to govern trade. It appears from the reports of the several coal companies, that there have been 1,196,163 tons of coal mined, this year, in excess of that produced for a corresponding period of the past twelve months. In the face of this fact the price of the article is very nearly double what it was a year ago, and the prospects of a decline are very uncertain indeed. We are, on the contrary, informed that consumers may be glad to purchase coal at the present rate, and that upon the advent of cold weather the price will be largely increased. It is difficult to reason calmly when reviewing this subject, and as for the inevitable laws of supply and demand, they are disposed of altogether. We are told that the quantity required by the Government is one cause of the high price, and that the difficulty of obtaining miners to work the drifts, is another. To refute these arguments, the published reports show an actual increase, by the miners who won't work, of more than 1,000,000 tons. These are large figures. We should like to know what it is that the Government is doing that it has not done two years ago, which requires such very great amounts of coal? The blockade has not been extended; the ships upon it have not been materially increased in number; no large expeditions are on foot; the iron for the iron-clads is pretty well under way; and it is a mystery to us what becomes of the supply. At this season it is common for families and dealers to lay in a quantity for the winter, and at the present prices, from \$7.50 to \$8.50 per coal-dealer's tun, it will take a round sum to prepare for the cold weather.

THE HEAT—HOT, HOTTER, HOTTEST.

Up to the time of going to press the heat continues unabated. Men seek, wearily, the coolest side of the street, and go about their duties with faces as red as boiled lobsters. Human nature seems resolving—not to dust again, but liquefying to water. The stages and rail cars in the morning are loaded down with a panting crowd, who, unable to endure the fatigue consequent upon the exertion of walking, stifle in the omnibus and car, where they are as thickly packed as herrings in a cask. The thermometer records 94° in the cool parts of the city, and the heat within close and small dwellings, is absolutely unendurable. Night brings no relief from the sultry air of the day; and between the high temperature and the mosquitoes existence seems a burthen. Anything relating to the arctic regions is pleasant food for thought, and the