

caused to travel by rollers, which act independently of those over which the apron passes, and consists in causing the said rollers to bite upon strips of leather, india-rubber, or other flexible material, so as to prevent them from acting upon the said apron direct. Another part consists in drying cotton, by causing a current of air, heated, or at the ordinary temperature, to be driven through the material by the exhausting or blowing action of a fan or fans.

1717. R. A. SMITH.—*Improvements in purifying gas.* Dated July 6, 1861.

The patentee claims the purifying of gas from sulphur and its compounds, except sulphuretted hydrogen, by treating it with alkaline solutions of certain metals, in the manner described.

## Correspondence.

### ACTUAL AND NOMINAL HORSE POWER; OR, FIGURES OF ARITHMETIC VERSUS FIGURES OF SPEECH

*To the Editor of the Journal of the Board of Arts and Manufactures.*

SIR,—In the preceding number of this journal there is an article of about three and a half pages, headed "A Standard Horse Power for Steam Engines," in which article the writer states that it is customary to value engines by the conventional unit of horse power. That in Britain the manufacturers have approximated to a common standard, but in Canada and the States nominal horse power, as a commercial unit of capacity, or power of performance, is an exceedingly vague expression. He also says that scarcely two manufacturers will give the same dimensions; that scarcely an individual manufacturer's own practice is uniform, and that it is a desideratum to have a common standard which would enable buyer and seller to deal with greater confidence and certainty, and is therefore a legitimate subject for legislation.

The article being long, even to prove the writer's case, it will be unnecessary to refer minutely to every portion of it, but since it is only to enable buyer and seller to deal with greater confidence, we fancy it is no difficult matter to show that they can deal with equal, if not greater, confidence under the present standard than they would do with the standard he alludes to, by buying by the real, "the actual" or effective horse power instead of the "nominal" one which he recommends.

In the case he refers to, of giving evidence regarding the power of a steam machine, where there were a dozen of witnesses examined, we venture to say that nine of those witnesses were in favor of the present standard, while only himself and another were for the nominal horse power. The nominal horse power advocates lost the case. The writer of that article says no two of these witnesses held the same opinion, farther than that a horse power should indicate the ability to elevate 33,000 lbs. one foot high, in one minute. Now, their agreeing upon this point is all that is necessary, as it is the actual horse power—in reality

what a horse can do. It was as much to avoid the difficulty arising from this not having been so universally agreed upon in Britain that the nominal horse power found favor, there being at that time a wide discrepancy of what a horse could do,

Smeaton allowing 22,916,

Desagliers . . . 27,500,

Watt . . . . 33,000 lbs., raised one foot

high, in one minute, and because this last was more generally received in Britain than the others it came to be exclusively adopted in this country, and its being so adopted renders it quite unnecessary to bring in any other standard. Any difficulty that may have arisen as to the power of steam engines, between the manufacturers and the buyers, has been instigated by the advocates of nominal horse power, which does not, and we hope never will obtain, in Canada, as a standard; and for this reason, that it is more likely to confuse and mislead the uninitiated than the present standard of "actual" or effective horse power.

He says that a standard horse power is as necessary as a standard bushel or a standard yard. So it is. And 33,000 lbs., raised one foot high, in one minute, is this standard, and better than any number of square or circular inches of piston surface, which he recommends. If pressure and speed were constant quantities, then we could have no objection to that mode of measurement which he recommends, but as these are not constant quantities, to adopt his mode of measurement would be adopting a false measure of power—"a fiction"—a mere figure of speech.

He says the great difference between the nominal and actual horse power, culminated in the Great Eastern, whose engines were nominally 2,600 horse power, but which worked up to 8,300 horse power. If this proves anything, it does prove that 2,600 was a false measurement of the power of the engines of the Great Eastern.

The article under review contains about forty paragraphs, twenty-eight of which are devoted to the steam engine, and the remainder to the boilers for steam engines. In paragraph No. 6 it is stated that actual horse power is liable to many disturbing causes, some of which vary with every change in the dimensions of the machinery, and its final determination can never be arrived at with exactness until the engine is at work and a diagram indicator applied to the determined point at which the force is to be delivered. In reference to this statement we would simply remark that the actual horse power, so far as relates to buying and selling dimensions, is not liable to disturbing causes. The rule holds good in every case, and is always the same. The dimensions, of course, "vary with the pressure and the speed," but the rule does not vary, and by this rule the buying and selling dimensions are so easily computed that the veriest novice in mechanics can generally perform it.

The diagram indicator is quite unnecessary for determining the actual—the buying and selling horse power of an engine. It is desirable, however, to test by a diagram indicator every steam engine, from time to time, in order to find out its efficiency, "if in good working order," and when not in good working order or condition. The diagram indicator will point out where and what the defect or derangement is, so that it can be at once