Scientific American.

ESTABLISHED 1845.

- - - EDITORS AND PROPRIETORS. MUNN & CO., PUBLISHED WEEKLY AT

No. 361 BROADWAY, - - NEW YORK.

TERMS FOR THE SCIENTIFIC AMERICAN. (Established 1845.)

The Scientific American Supplement (Established 1876)

(LESTAURBIEL 15/0) is a distinct paper from the SCIENTIFIC AMERICAN. THE SUPPLEMENT is issued weekly. Every number contains 16 octavo pages, uniform in size with SCIENTIFIC AMERICAN. Terms of subscription for SUPPLEMENT, \$500 a year, for the U.S., Canada er Mexico. \$600 a year, or £1 4s. 8d., to foreign countries belonging to the Postal Union. Single copies 10 cents. Sold by all newsdealers throughout the country. See prospectus, last page. **Combined Rates.**—The SCIENTIFIC AMERICAN and SUPPLEMENT will be sent for one year, to one address in U.S., Canada or Mexico, on receipt of seven & Murs. To foreign countries, eight & Mars and fifty cents a year, or £1 14s. 11d., postage prepaid.

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NEW YORK, SATURDAY, MARCH 6, 1897.

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No. 1105.

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Price 10 cents. For sale by all newsdealers.

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AMERICAN RAILWAY SPEEDS.

The Engineer, of London, is greatly disturbed from time to time because American railroad men-managers, master mechanics and engineers-persist in crediting their own locomotives with feats of speed and hauling power which are entirely beyond the capabilities of any English locomotive. This periodic irritation is discernible in every announcement of an exceptional American locomotive performance that may appear in the columns of our contemporary. Ordinarily the vexation appears in the form of an obvious query mark, deftly woven into the phraseology of what purports to be a simple announcement of the fact that a fast run has been made. But if the run should happen to have been particularly brilliant, the editor's wrath is manifested by his handing over the details of the performance to The Engineer's expert in figures, who proceeds to prove on general principles, and by the aid of sundry formulæ of unimpeachable antiquity, that, in the nature of things, the feat could never have been performed. No sooner does an American engineer "smash the record" than the expert proceeds to smash the engineer, burying the luckless wight under a very avalanche of theoretical calculations.

When locomotive No. 564, of the Lake Shore and 86 miles at the rate of 72.9 miles per hour, The Engithe line, the statements being duly certified by the difficult to credit. proper parties. This brought forth an acknowledgdiscredited by the expert was necessary—a somewhat superfluous admission.

After a brief period of well earned repose, our conthe Strong locomotive, runs which were certified by the proper officials and accepted as authentic by the engineering press throughout the country. It was acknowledged at the time that the loads hauled, the speed, and the indicated horse power rendered the performances among the most remarkable on record : but the trials were so carefully carried out, and the facts were reported by such impartial and unimpeachable witnesses, that they have never been seriously questioned.

The Engineer, however, again doubts the credibility of railroad men in this country, and does not hesitate to say so. It proceeds to demolish their testimony in its customary and familiar style. The controversy is too lengthy for reproduction in these columns, but Mr. Strong's letter to the Railroad Gazette, The Engineer's criticism, and a reply by Mr. Strong addressed to the editor of the SCIENTIFIC AMERICAN will be found in the current issue of the SUPPLEMENT.

We are given to understand that, as on the occasion of the Lake Shore run above referred to, The Engineer is to be supplied with the certified statements of the officials of the roads on which the runs were made. on the receipt of which, no doubt, our contemporary will proceed to revise its already revised calculations.

In general it may be said that it is altogether absurd to make the data of English locomotive performance and his work is done. the basis of an argument as to the possible or impossible performance of an American locomotive, so radically different are the leading features of the two designs. The American machine can haul the larger loads be cause it is specially designed to do so, and the same reason must be given for the relatively large horse power which it is able to indicate. and does indicate, on such runs as these in question. Indicated seven or eight foot drivers and slower piston speed. The ports of an English locomotive's cylinders are short and cramped, ill adapted to give that free admiseffective work at very high speeds. The slow piston speed and the low mean cylinder pressure will account for the small indicated horse power of English locomotives, which ordinarily ranges from 700 to 800; whereas the locomotives that haul the heavy expresses in this country will indicate from 1,100 to 1,300 horse power when working up to their full power. Just here lies the explanation of the relatively great size of locomothe case of patent franchises. tive boilers in America. Engines that use such large volumes of steam require large boiler capacity; and hence the latest boilers in this country have from 1,800 1,000 to 1,300 square feet in England.

Other things being equal, the locomotive that can pass the greatest weight of dry steam through its cylinders, in traversing a given distance on the rails, will exert the greatest power. English engineers, who are continually expressing their surprise at the enormous size of American locomotive boilers, should bear in mind that it is its large boiler capacity which primarily enables the American locomotive to haul heavy loads at speeds which are altogether beyond the power of the English machine.

The English locomotive is handicapped at the very start by its small boiler with only 1,000 to 1,200 square feet of heating surface, and the valve gear and piston speed are proportioned to match it, the ports being small and the piston speed slow. The extremes of design are shown in a comparison of such engines as the new express locomotives of the New York, New Haven and Hartford Railroad in this country and the Northeastern Railroad in England. The New Haven locomotive, with 6 foot drivers and 20×24 inch cylinders, has 2,114 square feet of heating surface and 30 square feet of grate area. The Northeastern engine, with 20×26 inch cylinders and 7 foot $7\frac{1}{4}$ inch drivers, has only 1,216 square feet of heating surface and 20 square feet of grate area. For a supreme effort in Michigan Southern Railroad, hauled a 150 ton train for hauling a maximum load at a maximum speed, which is the correct design? The Engineer might answer neer proved to an absolute demonstration that such a that the English engine is not designed for such exthing could never have occurred. Thereupon the cessive work. But the American locomotive is, and by editor was favored by the officials of the road with all virtue of its design it is capable of those extraordinary the details of the performance, including a profile of exhibitions of power which our contemporary finds it

The locomotive which made the runs that are now ment that, in the presence of such overwhelming called in question represents an extreme application of testimony, some revision of the elaborate calculations the distinctive features of American design. The double upon the basis of which the performance had been furnace gives 60 square feet of grate area, as against 20 square feet in the English locomotive; the gridiron valves give 34 inches lead line or length of port on each valve, with an area of 251/2 square inches, as temporary has again been disturbed by the performance against 10 inches lead line or length of port on each of American locomotives, the immediate cause being a valve with an area of 12½ square inches on the averletter written to the Railroad Gazette by Mr. George S. age English locomotive; and with a 75 per cent cut-off Strong, in which he quotes certain runs made in 1887 by this locomotive has given as high as 150 pounds mean pressure in the cylinders.

In conclusion it may be said that if the designers of English locomotives would cease to strive after an ideal economy in fuel, and devote their attention to the more serious problem of hauling heavy loads at high speed, they could solve the problem at once by adopting the practical and common sense methods of American builders; moreover, if The Engineer would spend as much time and energy in teaching its readers how and why the American locomotive does certain things as it now spends in trying to prove that it never has and never will do them, it would be more in line with modern developments and less open to the charge of persistent and unreasonable prejudice.

"DEFECTIVE PATENT LAWS."

The love of criticism is a quality inherent in human nature. Perfection is never attained by man, and his work is always open to unfavorable comment. This statement applies broadly to almost every case, and holds even when the critic has accurate knowledge of the subject he treats of. But the wings of his imagination work with infinitely greater vigor when they move in an atmosphere of ignorance. He has but to assume the facts in the case and then to criticise them,

Recently the patent law of the United States has been thus criticised by one of our Chicago contemporaries. Among its editorial articles appears one bearing the title "Defective Patent Laws," which criticises unfavorably what the writer of the article in question conceives the patent laws of this country to be, and undertakes in this vein of ignorance to compare them with those of foreign lands. The utter ignorance of horse power is the product of piston pressure by piston existing facts, and the misconception of the scope of speed, and the locomotive that is able to maintain the patent system, is impressive. It is also impossible to a high mean piston pressure in conjunction with high ascertain whether the writer thinks that the inventor piston velocity will show a proportionally large horse is too hardly dealt with or whether he considers the power. The American locomotive is provided with public the sufferer. Our only inducement to notice large port areas and drivers of moderate diameter; an article containing such a mass of misstatements and in running a given distance, when working up to is the fact that the journal has a somewhat wide circuits full power, it will use a far greater volume of steam | lation, and will go to inspire discontent with the pain its cylinders than an English locomotive with its tentstatutes. On them a vast body of decisions and rules of practice have been based, and, consequently, our patent law is so well formulated that its practice has become practically codified. A lawyer who takes sion and escape to the steam which is essential to out a patent for a client knows what he has to expect from the Patent Office examiners, and works in the full enlightenment of such knowledge. He has in his mind the general scope of decisions in the circuit and supreme courts, and formulates his claims in accordance therewith. Radical changes in the patent law would work irreparable harm to inventors by putting them at sea with regard to their rights. Stability is a necessity in A mistaken apprehension as to the scope and function of a caveat marks the opening of the article. The writer states that a caveat is objectionable, as by the to 2,200 square feet of heating surface, as against from payment of ten dollars per annum it may be kept alive and practically extend the life of a patent for an inde-

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