

Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

At No. 37 Park-row (Park Building), New York.

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

TERMS—Two Dollars per annum.—One Dollar in advance, and the remainder in six months.

Single copies of the paper are on sale at the office of publication, and at all the periodical stores in the United States and Canada. Sampson Low, Son & Co., the American Bookellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

See Prospectus on last page. No Traveling Agents employed.

VOL. II., No. 4.....[NEW SERIES.].....Fifteenth Year.

NEW YORK, SATURDAY, JANUARY 21, 1860.

A LAW THAT CANNOT BE EXECUTED—CONGRESSIONAL BLINDNESS ABOUT PATENT MATTERS—REFORMS WANTED.

HE members of the last session of Congress appear to have been strong believers in astounding achievements in the art of book-making. A story is told of a London populace once flocking in crowds to witness an exhibition at which a mountebank, by flaming placards, had promised to perform the wonderful feat of squeezing himself into a quart bottle. We do not think that the members of the last session were in London during this particular occurrence, but had they been there, in all likelihood they would have followed the multitude to the impossible bottle scene. We thus judge because, at the last session of Congress, a resolution was passed making provision for the publication of the mechanical portion of the report of the Patent Office, but containing the requirement that it was not to occupy more than 800 pages of the usual form and size. Into such a limited space, engravings of all the patents issued during the year, with their descriptions, were to be packed and printed—a feat equally as difficult of execution as the promise of the quart bottle squeezer. The Secretary of the Interior, like a good public servant, endeavored to carry out the resolution of Congress, but in his report, published on page 19 of our present volume, he tells the members that, although he was very anxious to comply in all respects with their expressed will, and he had given the subject an unusual degree of attention, yet “a literal compliance with the law was a physical impossibility.” This fact, we regret to state, affords disagreeable evidence of a great want of intelligence on the part of members of Congress in reference to the wants of inventors, the progress of American art and science, the operations of the Patent Office, and the legislation required to promote its best interests.

It is not out of place here to advise them to make themselves better acquainted with the beneficial operations of our Patent Office, and the great influence it exercises in developing the wealth and genius of our country. We are confident that if they investigate this subject with judicious care, they will enact such a bill at this session, for reforming the Patent laws, as will do them great honor. This is a subject altogether unconnected with party politics; it relates to national progress in art and science; and it is therefore of interest to every citizen, and should receive a prompt and generous consideration.

The Secretary of the Interior states that the attention of Congress has been earnestly invoked for several years past to certain amendments in the existing Patent laws which experience has proved to be “highly important, if not absolutely necessary, and committees have approved these amendments, and reported in favor of their adoption, but in every case Congress has failed to consider and act upon the reports.” These are facts which cannot be gainsayed; they are blots upon the character of former sessions of Congress, which the members of the present session ought to wash out. Will they do it?

Two special reforms in the Patent laws are held to be early and absolutely demanded. One is provision for an increase of the examining corps, and other necessary assistance in the Patent Office, to execute the business which comes before it quickly and carefully. It has been found by experience that when the Patent Office drags

behind in its work, so that it is unable to examine and act upon applications for patents promptly, invention and discovery drag behind in relative proportions. This is clearly set forth in the report of the Secretary of the Interior, and is a fact peculiarly deserving of great attention.

The other reform is a reduction of patent fees to foreigners. The attention of our government has lately been called to this feature of our laws by the British minister at Washington. The sum of \$500 is now charged as the patent fee for a British subject, while in England there is no discrimination between an American and a native-born Briton. There are other reforms required in the Patent laws to which we may advert at some future time. Our object at present is principally to direct the attention of members of Congress to the necessity of an early examination of this subject. In conclusion, we must inform the members of Congress that the inventors of our country are now a large, worthy, and most useful class, and they have a right to claim a due share of legislative attention. They have also just grounds of complaint that their interests have been too long neglected and overlooked for discussions and legislation upon very paltry subjects compared with the encouragement of genius and the advancement of American art and science.

ENGINEERING PRECEDENTS.

This is the title of certain practical works which B. F. Isherwood, Chief Engineer of the United States Navy, has given to the public; the information contained in them being principally his own accumulated experience. The first volume published related chiefly to the propellers and engines of British gun-boats, and was reviewed by us on page 237, Vol. XIV. (old series), SCIENTIFIC AMERICAN. The second volume is just issued by the same publishers—Balliere & Brothers, this city—and it is of far more general importance to American engineers than the first. It is divided into several sections, embracing the details of distinct experiments which were ordered by the United States Navy Department, and executed by the Board of Naval Engineers, of which the author is a member. Experiments were made with the different kinds of coal to test their evaporative qualities under a boiler at the Brooklyn Navy Yard, and a gain of over six per cent in evaporative effect was obtained by simply admitting air through a number of small holes in the furnace door. Thus, with two kinds of anthracite coal—Blackheath and Treverton—the former evaporated 6.21 lbs. of water per pound of fuel, and the latter 6.99, when air was admitted through minute orifices in the furnace door; while, without such holes, only 5.87 and 6.50 lbs. were evaporated with the same amount of fuel. This is a very important fact for engineers, as by this simple arrangement, which costs nothing, over six per cent of fuel may be saved under all boilers in which “hard” coal is used.

Experiments were also made to determine the evaporative efficiency of horizontal and vertical tubes in boilers, in which great superiority is attributed to the latter tubes. With a maximum rate of combustion, both boilers being equal, the vertical *water* tubes furnished 27½ per cent more of steam than horizontal *flue* tubes—a very great difference, well worthy of general consideration. Mr. Isherwood also made experiments with a peculiar vertical tubular boiler, designed by Thomas Prosser, of Platt-street, this city, in which over 11 pounds of steam were evaporated from 212° (the heat of feed water) with one pound of good anthracite coal. We have not space to devote further remarks to this part of the book.

Another important department relates to experiments with the use of steam, both without and with expansion. It is generally considered that a great gain is secured by expanding steam in cylinders, and, theoretically, this is easily demonstrated; yet there are many engineers who assert that no saving of fuel is practically obtained by expansion. Such a difference of opinion can only be settled by correct experiment, and we certainly expected to find this question exhausted by these trials, and no room left for argument; in this expectation, however, we are disappointed. The experiments were made with the smithery engine and boiler, at the Brooklyn Navy Yard, and extended over a period of 26 days, averaging nine hours each. During one set, the steam was admitted during the whole stroke, during the other, it was cut off at 22-100ths—a little over one-fifth—of the stroke,

and expanded during the remainder. When using steam without expansion, the pressure was 28 6 lbs.; with expansion, it was 34.8 lbs. The amount of coal consumed per horse-power, without expanding, was 14.17 lbs.; with expansion, 11.65 lbs. This is considerable of a gain, yet far from the amount which ought to have been obtained according to the theory of steam expansion. We would have expected in Mr. Isherwood an advocate for a variable and extensive range of expansion, with all the improvements of “cut-offs” and steam jackets, which are necessary to the scientific working of steam, but he has taken up a position of hostility to these, and he is almost a disbeliever in any gain at all being secured from working steam expansively. He takes occasion (without cause) to speak contemptuously of patent “cut-offs,” and he asserts that the gain by expansion is restricted “to very narrow limits, even under favorable conditions.” He says, in plain language, that “variable expansion gear, with a wide range and the ability to cut off, does not economize fuel more than simple kinds, cutting off longer and attached to smaller engines doing the same work, with the power graduated by the throttle.” When the engineering world comes to view the question in this light, then, according to the opinion of Mr. Isherwood, “a great step will be taken in the right direction” towards the success and cheapness of operating marine engines.

We have not room to present the arguments and opinions of the above-named author so as to do them justice, but in our opinion the experiments undertaken at the Brooklyn Navy Yard, to test the value of expanded steam, are of little value, because they were not made according to the necessary conditions towards a fair comparison; the engine and boiler were not adapted for working steam expansively according to the most approved practice. As more condensation takes place in the inside of a cylinder in which the steam is expanded than without expansion, it was essential to full success and a fair trial that such a device as the steam jacket should have been attached to the engine at the Brooklyn Navy Yard to fulfill the necessary conditions to success and a fair comparison, with and without expansion. By obviating condensation in the inside of the cylinder of a condensing engine, much back-pressure is prevented when the eduction valve is opened and the cylinder brought into open connection with the vacuum. Mr. Isherwood has a very indifferent opinion of the efficacy of steam jackets, yet the careful experiments made by Mr. Gordon Mackay, of Paterson, N. J.—noticed on page 309, Vol. XIV. (old series), SCIENTIFIC AMERICAN—showed a gain of 20 per cent by the use of that arrangement.

The statements which have been given to the public regarding the great saving effected by the patent “cut-offs” of Sickles, Corliss, and others, which have been described in our columns as new improvements in steam engines, must either be right, and Mr. Isherwood wrong, or *vice versa*. But as it regards the great saving effected in fuel by high expansion in properly constructed engines with steam jackets, the account published on page 25 of our present volume completely confutes all opposing opinions. Three steamships running on the South American coast were originally fitted with very good engines and low expansion; they consumed over 1,100 tons of coal per round trip, and, as the fuel was very dear, the great object of economy was the saving of coal. Messrs. Randolph & Elder, of Glasgow, by removing the old engines and putting in others, having very high expansive qualities, have reduced the fuel one-half—a gain of 100 per cent. This is not theory; it is plain fact. It is not an experiment with a very poor smithery engine; but it is a grand, practical, incontrovertible argument. The work of Mr. Isherwood deserves the attention of our engineers; we are confident that it will bring out many opposing opinions to the conclusions of its author; but as he is a very close observer, and possesses great ability as an engineer, he is no doubt fully prepared to maintain the “lists” against all who may choose to attack him.

EXPLOSION OF STEAM PIPES.—The pipe used for heating the packing room of Colt's armory recently exploded, and the condensed vapor greatly injured the large store of arms in the building. The amount of the damage cannot now be definitely ascertained, but the loss is large, reaching thousands of dollars; some estimate it at \$17,000. Many of the pistols are badly rusted and the wood is swollen so that they will require to be taken to pieces, cleaned, blued and re-stocked.