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.

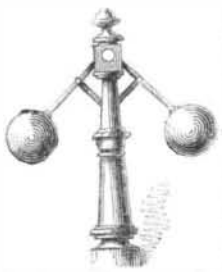
Sampson Low, Son & Co., the American Booksellers, No. 47 Ludgate Hill, London, England, are the British Agents to receive subscriptions for the SCIENTIFIC AMERICAN.

☞ See Prospectus on last page. No Traveling Agents employed.

VOL. II., NO. 2.....[NEW SERIES.].....*Fifteenth Year.*

NEW YORK, SATURDAY, JANUARY 7, 1860.

STEAM ENGINEERING IN 1860.



HERE is no subject of greater importance to the commercial, manufacturing and engineering community, than that of saving fuel. That man who makes one pound of coal do the work of two, in driving machinery, is equally as great a benefactor as he who has made two ears of grain come forth from ground where only one was raised before. This assertion is more especially true as it relates to steamships, because every tun of coal saved in one of these is not only a direct gain, but affords a double benefit, as it also permits, in the same proportion, a gain in carrying payable cargo. Thus, in a voyage from New York to Liverpool, it requires 100 tuns of coal per diem for the largest steamers; now, if this amount were reduced one half, and the same speed and power maintained in the engines, a saving of $2,000 for coal—at $4 per tun—would be secured in ten days, besides a paying cargo of 500 tuns added to the profits. This single example will show the immense benefits resulting from the saving of fuel. But some persons appear to have considered the steam engine perfected; hence they have sought to obtain other and more economical motors to supersede it. Again and again we have called attention to the fact that most steam engines did not give out more than about one-fourth of the power in the fuel which was consumed to drive them; and while this was the case, there was vast room for improvement. We are happy to say that very great improvements have been chronicled during the past year, and we commence 1860 with a decided advance in steam engineering.

On page 125, Vol. XIV. (old series) of the SCIENTIFIC AMERICAN, we earnestly invited the attention of marine engineers to the performances of steamers belonging to a British company running between Valparaiso and Panama; and we stated that they were doing as much duty as most other steamers of the same capacity and power, with one half the amount of fuel. During the year 1859, more facts have come to light regarding these vessels. Three steamships on this route, named the *Callao*, *Lima* and *Bogota*, each 245 feet long, 36 feet broad and 23 feet deep—pretty large vessels—were originally fitted with the first-class ordinary marine engines. With these they used to consume 1,150 tuns of coal per round trip: and as coals cost $10 per tun in that region, it was a question of vital importance to decrease the amount and still maintain the same power and speed. This was undertaken by Messrs. Elder & Randolph, engineers, of Glasgow, by removing the old engines and replacing them with new and highly expanding ones. These are peculiar and deserve a short description:—Each engine has two cylinders; one is small, of 25 inches diameter, and receives the steam first at 42 lbs. pressure, which is cut off at one-third of the stroke and is allowed to expand to three times its volume; then it exhausts into a large cylinder of three times its capacity, and is thus expanded to nine times its volume; becoming gradnally reduced in pressure to 4 2-3 lbs. before it exhausts into the condenser. With this class of engines these vessels now use only one-half the fuel they formerly consumed, and yet maintain the same power. The cylinders of the engines have jackets, and the small cylinder especially is kept at a temperature (on the outside) of 400° Fah by superheated steam, so as to prevent any condensation in the inside. The eduction valve of the small cylinder also answers for the induction to the large cylinder; each is of five feet stroke. The eduction port remains open during the entire stroke of the piston, thus giving free egress to the steam.

We have no marine engines of this character in any of our steamers or river boats, in fact, we have paid too little attention to the saving of fuel, and there are some engineers who contend that no saving can be effected by high expansion. Either one or two of our old North river boats were fitted with Woolfe's double cylinders; and we believe that no gain was experienced in them over single cylinders of large capacity for expansion; but our engineers must try steam jackets and superheated steam, in 1860 and see what new results they will secure.

Another great saving in fuel has also been effected in the use of combined saturated and superheated steam, according to the patent of the Messrs. Wethered, of Baltimore, Md., which was illustrated on page 45, Vol. X. (old series) of the SCIENTIFIC AMERICAN. This system has been applied to the British royal mail steamship *Avon*, running from Southampton to Brazil, and with such success that the company report a saving of 30 per cent in fuel. This steamer has now run 125,000 miles with the superheating apparatus on board, and the tubes are nearly as good to-day as when first put in. Several of the steamships of the British navy have also had this system applied to them, and it has given satisfaction It has now engaged so much favorable attention in England that one of the firm finds it necessary to remain constantly in that country. On the continent of Europe, also, several steamboats running on the Danube now use the Wethered system of steam; and yet it is remarkable that, while this improvement is extending in the Old World, and is very favorably regarded there, it is but little known at home. One of the large steamboats on the Chesapeake Bay is now being fitted-up with this arrangement; but this is the only application of it (known to us) upon a scale worthy of consideration in our country. The ill-fated *Arctic*, of the Collins' line, was provided with such an arrangement; but it proved a failure on account of mechanical difficulties in the *application*, not in the principle. These facts are all worthy of the attention of our engineers in 1860; and afford matter for discussion and consideration in commencing the year. It is no uncommon thing to find our steamships and river boats consuming from three to seven pounds of coal per horse-power, per hour; with proper appliances, they should not use more than two pounds to do the same work. With the use of the Blanchard combustion system in the furnaces—illustrated on page 412, Vol. XIII. (old series) of the SCIENTIFIC AMERICAN—superheated steam, high expansion and steam jackets, the amount of coal hourly consumed may yet be reduced to only *one* pound per horse-power in our steamboats and ships; the year 1860 should at least make considerable strides towards the attainment of such a result.

AN IMMENSE YEAR'S BUSINESS!

In our last number we announced that we had associated with us the *Hon. Judge Mason, of Iowa, the late Commissioner of Patents*; and we stated that, on the first day of January, 1860, we found ourselves conducting the most extensive and best arranged agency in the world for the procuration of Letters Patent. This fact will be made perfectly clear by the use of a few figures. During the year 1859 there issued from the Patent Office (according to the list of patents published in the SCIENTIFIC AMERICAN from week to week) about four thousand, one hundred and seventy-five Letters Patent. Of this number *fourteen hundred and forty* were granted to the clients of the Scientific American Patent Agency, or more than *one-third* of the whole! If this large number of patents issued to our clients is substracted from the whole number granted, the remainder shows that only twenty-seven hundred patents are left to be divided among the other (at least) three hundred patent agents located in the various cities and towns of the United States—an average of less than *ten* patents each during the whole year!

The vast amount of business done by the firm of MUNN & COMPANY is a sure indication that the inventors of the country well understand where they can look for the greatest skill, fidelity and vigor in the prosecution of their cases before the Patent Office. Of course, we should not expect, under the most thorough and complete system that human ingenuity could devise, to secure patents for *every* application that we are called upon to make; neither do we expect, as long as we do business of any kind whatsoever, to please *everybody*; but there is one fact which is well understood by all who know anything about such matters, namely, that the Scientific American Patent Agency will not allow any one of the cases of its multitudinous clients to fail for want of careful preparation and prosecution. Whenever an invention contains any patentable novelty at all, we are bound—if the applicant desires it—to insist upon its recognition by the august functionaries of the Patent Office; and if we cannot secure the rights of our clients before that bureau, we have the facilities to obtain those rights elsewhere. We are happy to state that the officers of the Patent Office, from Commissioner Bishop downwards (with few exceptions), realize the truth that that important department was established to foster inventive genius and to encourage inventors to seek its protection.

The recognized ability of Judge Mason, and the high character which he sustained as an able and faithful Commissioner of Patents, together with our own experience of nearly *fifteen* years in the examination of inventions and the preparation of all kinds of patent documents, combine to render the Scientific American Patent Agency as thorough and complete as it can possibly be made, unless, indeed, the whole Patent Office itself should be turned into our lap!

EXTENSION OF AN IMPORTANT PATENT.

The Commissioner of Patents has granted an extension, for seven years, of the patent issued on Dec. 20, 1845, to Calvin B. Rogers, of Saybrook, Conn., for an improvement in machinery for dressing combs. The invention was chiefly intended for the manufacture of fine toothed ivory combs; but it is adapted to the cutting of almost any material.

It appeared from the testimony that, prior to Rogers' invention, the "blanks" or bits of ivory of which the comb was to be made were fashioned into proper form almost exclusively by hand; and that a good workman was enabled to dress about 600 blanks per day. The workman was compelled to hold each bit of ivory separately against the cutting tool, and to depend upon his eye for the form given. The hand-dressed blanks were of course wanting in uniformity to a greater or less extent.

In the use of Rogers' machine the blanks in large quantities are put into a sort of hopper, and the apparatus is set in motion by steam or other power. The blanks are automatically taken from the hopper and presented to the various cutting tools, and dressed, beveled and delivered from the machine in a finished condition, at the rate of about 3,000 blanks per diem. The pieces thus dressed are all beveled and finished with the utmost exactitude and nicety The evidence further showed that about 400,000 dozens of combs of the above character are annually made in this country; and that a single workman with five of Rogers' machines would be able to supply the entire trade.

Mr. Rogers appears to have been the first person who ever invented self-acting machinery for comb dressing. It is but just that he should receive an extension of his patent, and we trust that, through it, he and his assignees will be abundantly rewarded for his ingenuity. His discovery is a public benefit. The extension was obtained through the Scientific American Patent Agency.

BOUND VOLUMES OF THE SCIENTIFIC AMERICAN.—We are now prepared to furnish bound volumes (I., new series) in any quantity that may be desired. The volume is composed of 420 pages, between two and three hundred original engravings, and is bound in handsome style with illuminated gilt sides. Price $1.50. They may be had of most of the booksellers and periodical dealers in the country. We believe it is the cheapest book published and sold this season.

TREATING FURS.—When furs have been laid away for some months they acquire an old squeezed appearance which may be remedied in a great measure as follows:—Warm some new bran or fine sawdust in a pan, but do not let it burn; then rub it thoroughly into the fur with the hand. Repeat this two or three times; then shake and brush the fur until free from dust.