THE

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.

☞ American and Mexican News Company, Mexico, are Agents for the SCIENTIFIC AMERICAN.

☞ Messrs. Trubner & Co., 60 Paternoster Row, London, are also Agents for the SCIENTIFIC AMERICAN.

☞ "The American News Company," Agents, 121 Nassau street, New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent on them will be promptly attended to.

VOL. XV., No. 22, [NEW SERIES.] *Twenty-first Year.*

NEW YORK, SATURDAY, NOV. 24, 1866.

Contents:

(Illustrated articles are marked with an asterisk.)

*Improved Gang Plow..... 349
Water-spouts in the Mountains..... 349
The Needle Gun..... 351
Japan..... 351
New Safe Lock..... 351
Statistics of Photography... 351
The Brewe ies of Chicago... 351
Dundas Cultivator Reissue.. 351
*Improvement in the Snow Governor Valve..... 352
Banquet to Cyrus W. Field.. 352
*The Arabic Numerals..... 353
*Position of the Piston when the Crank is Vertical..... 353
Scientific Blasting — Nitro-Glycerin..... 353
Circulation in Steam Boilers. 353
Small Electric Machine Wanted..... 354
Notes and Queries..... 354
Extension Notices..... 354
New Inventions..... 354, 355
*Improved Turntable Pivot. 356
Erie Basin Dry-Dock Company..... 356
*Williams's Potato Washer.. 356
"Time Will Tell."..... 356
Progress of the Pacific Railway..... 356
Enlargement of the Scientific American for 1867... 357
Wrought Scrap Iron for Forgings..... 357
Change in the Style of Patents..... 357
Place of the Counterbalance on Saw Mill Sashes..... 357
Practical Hints..... 357
Patent Claims, 358, 359, 360, 361, 362
Advertisements..... 363, 364, 365
*Improved Saw Mill Trestle. 366
Chilled Railway Wheels..... 366
American Railway Wheels in England..... 366
Prospectus..... 366

ENLARGEMENT OF THE SCIENTIFIC AMERICAN FOR 1867.

On the first of January, 1867, the SCIENTIFIC AMERICAN completes its Twenty-First Year. The first number of this journal, a folio of four pages, appeared in the Summer of 1845, under the editorial management of Rufus Porter, a scientific enthusiast, who still lives in anticipation that, sooner or later, he may fly to the uttermost parts of the earth in a balloon. That volume abounded in the editor's peculiar scientific and spiritual theories and visions, and was adapted to a very narrow circle. It was, however, the basis upon which the present Editors and Proprietors entertained the notion that a Journal of Popular Science might be built up, which would supply a want seriously felt by the Mechanics, Manufacturers, and Inventors of this country. Upon assuming the management of the paper we determined, upon the commencement of a new volume, to enlarge it and change its form to eight pages. Our expectations were not disappointed. Our patrons responded generously, and the circulation of the paper rapidly increased, and from that time onward the SCIENTIFIC AMERICAN has been a recognized power in the development and extension of every interest bearing upon the Industrial Arts and Sciences.

In 1859, still further encouraged by the success that crowned our labors, and to meet the great pressure upon our columns, we felt obliged to double the size of the paper to sixteen pages. Even this enlargement, however, has proved inadequate to the wants of our readers and advertising patrons, and now, in spite of the greatly enhanced cost of paper and all other materials, we propose—now that the SCIENTIFIC AMERICAN has become of age—on the first of January to enlarge and improve it in every respect. The proposed enlargement will give our readers an increase equivalent to seven additional pages of reading of the present issue, and will enable us to enter more extensively into the important details of American and Foreign Industry, Art, Science, and Discovery, than our space, hitherto, has permitted.

This contemplated change will involve an additional cost for editorial talent, mechanical labor, paper, etc., of nearly twenty thousand dollars per year; but we have fully decided to undertake it without increasing the subscription price. The fact is indisputable that the SCIENTIFIC AMERICAN will be, by far, the cheapest and most valuable paper of the kind ever published. Its circulation is now more than the combined weekly issues of all similar journals in this country and Great Britain, which fact alone attests how it is appreciated by its intelligent readers. The position it now holds will not be relinquished if industry, talent, and a liberal expenditure of money can produce a journal worthy of public confidence and a wide-spread circulation.

Under the new arrangement the SCIENTIFIC AMERICAN will contain more reading matter, at one-half the cost, than the largest scientific journal published in England.

WROUGHT SCRAP IRON FOR FORGINGS.

The breaking of so many shafts of our sea-going steamers—instance those of the steamers *Atlantic* and *Pacific*, several years since, in the Collins Liverpool line, and, more recently, several shafts as well as cranks, of the Pacific Mail Company's ships—has led us to examine the subject, and inquire of what material these shafts, cranks, etc., were made.

From the most reliable information we have gathered, we find they were made of wrought scrap iron, of which it appears there are several kinds.

The first is the "common scrap of commerce," which is gathered from the thousands of smiths' shops throughout the country.

The second is what is known as "railroad scrap," which consists of old rails, bolts, plates, etc., that have been used in ordinary railway operations.

The third is "boiler scrap," which is composed of sheets and rivets from condemned steam boilers.

The fourth is what is called "selected scrap." This consists of old horseshoes, horseshoe nails, and the clippings from the tack-plate mills of the country.

The first two of the kinds of scrap iron above enumerated are made up of all and every kind of iron manufactured in this country and in England, from the most inferior of Welsh bars up to the best American brands in market. Russia, Swede, and Norway irons, are not generally used for ordinary purposes, on account of their high price.

The third class of scrap iron ought to be of the best iron that can be made; but unfortunately such is not the case; an evidence of which is the frequent boiler explosions from one end of the country to the other; consequently there is no certainty of getting a sound, uniform piece of forging, even if boiler scrap is used.

As for the fourth class—selected scrap—its quantity is so inconsiderable that any discussion of its merits or demerits will avail nothing in the object sought to be obtained by our remarks on the subject under consideration. As for old horseshoes and nails, they are scattered over such a vast extent of country, that to make them a specialty would cost more than their value, after re-manufacture into the kinds of forgings we refer to; and as for tack-plate scrap, we feel safe in saying, the very nature of the tack manufacture—the cutting the plates into articles so small as carpet tacks for instance—precludes the possibility of any large quantity of "scrap" remaining after the tack maker has used every delicate little piece that his machine will cut.

The results of our investigations convince us that at least ninety per cent, if not more, of all scrap forgings are made from the first three kinds of scrap mentioned; it is practically impossible to make, with certainty, any piece of forging, and more particularly large shafts, cranks, etc., which shall be reliable, and which can be depended upon for strength and tenacity, where scrap iron, composed of such great varieties and qualities as we have shown, is used. The various kinds of iron will not unite—will not weld thoroughly, heat and hammer them as much as you may.

From the examination we have given this subject, we are of the opinion that the only reliable and safe course for our forge-masters to pursue, is to make their forgings of one kind of iron. Let them test the various brands of foreign and American irons, and use only the strongest and most tenacious that can be procured; and we feel confident we shall hear no more of broken steamer shafts, endangering a loss of life and property.

We are well aware that a judicious mixture of cast irons often improves the quality, and gives a stronger and better casting than otherwise; but such is not the case with wrought iron. We would as soon think of making a railway bridge of oak, pine, and whitewood, and expect it to be as strong as though it were made exclusively of the best of white oak, as to suppose that a steamer shaft made of mixed scrap iron would be as strong and reliable as it would be if made of one quality, and that the best iron that can be manufactured.

CHANGE IN THE STYLE OF PATENTS.

But few are aware of the fact that all letters patent issuing from the United States Patent Office on and after the 20th of this month, will be in an entirely new dress, on different material, smaller, neater, and containing a printed specification. The patent proper, or grant, instead of containing the design of the Patent Office building, will have an engraving intended to show the progress of invention, the details being quite clever, and which, by way of comparison and contrast, will always appear fresh and pleasing to the eye. This beautiful design is original with Mr. Theaker, our present courteous and efficient Commissioner of Patents.

Place of the Counterbalance on Saw Mill Sashes.

A writer, G. W. P., Ogdensburgh, N. Y., doubts the propriety of placing the counterbalance of vertical saw mills opposite the crank. He says, the gate, brought to a stand-still at the extremity of its stroke, offers heavy resistance to the motion of the wheel, suddenly checking its velocity, the centripetal as well as the centrifugal force being instantly counteracted. Now, considering the wheel truly balanced and the counterbalance an adjustable weight, capable of exerting its force upon a given point on the wheel; and supposing the momentum of the wheel to be thus suddenly checked, the counterbalance will exert its power, not in a vertical line opposing the shock, but in the line of flight, should it then be detached from the wheel.

This shows that the counterbalance does not so much tend to counteract the vertical shock as to give a horizontal shock to the pillow blocks.

He recommends placing the counterbalance at a point in advance of the crank, as when the crank pin is at its lowest point, the counterbalance at a point a little above a line drawn through the axis of rotation, so that it precedes the crank's motion about one-third of the circumference. He thinks the subject is worthy the attention of scientific mechanics and practical men.

Practical Hints.

Under this title we shall communicate to our readers a series of short articles, containing such useful information as has been proved by experience of practical men to be reliable, and, therefore, desirable to be more universally known and applied. We ask contributions to this column from our readers.

No. 1. TO PREVENT RATS FROM DAMAGING LEATHER BELTING.—It is not an uncommon occurrence in factories where steam power is used, that during the night, or periods that the machinery is stationary and the shop abandoned, the rats will eat the leather belting, where it is accessible to them; for instance, where it passes through openings in the floor; cases have even happened that they gnawed holes in the floor just over the place where a belt was running horizontally in order to reach and eat pieces out of it.

Now, it is a singular fact that rats will not touch anything containing castor oil, or even only covered with it, and, therefore, to guard belting against