The Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY

No. 37 Park Row (Park Building), New York

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

TERMS—Three Dollars per annum—One Dollar in advance, for four months.
Single copies of the paper are on sale at the office of publication, and all 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. IX, NO. 25 ...[NEW SERIES.]..... *Nineteenth Year.*

NEW YORK, SATURDAY, DECEMBER 19, 1863.

OUR NEW DRESS.

With the commencement of the new volume on the 1st of January next, we shall present the SCIENTIFIC AMERICAN, which has now attained its eighteenth year, in a new and handsome dress—one, we trust, that will become its age and character. Though we are growing old and somewhat *gray* in the service, we have still vigor and determination enough left to make us desire that our next volume should be by far the best yet issued. We shall continue to trim the midnight lamp, if necessary, in order that we may keep the standard of the SCIENTIFIC AMERICAN up to any former period in its history. We believe that no other journal ever published has had truer or better friends than ours; and we again appeal to them to aid us in promoting its more widespread circulation. We do not depend upon agents; we prefer to rely upon the good words and deeds of our friends, and upon the well-established character of our journal, to increase its circulation. Friends! lend us a little of your valuable time in increasing our subscription list, and we will endeavor to more than repay you by making it still more worthy of your confidence and support

CONDENSING AND HIGH-PRESSURE ENGINES.

The London *Mechanic's Magazine* advocates the adoption of high-pressure engines in place of condensing ones. It says:—"A very little additional expense will secure a thoroughly good boiler, capable of carrying high-pressure steam with much greater safety than a low-priced one, with steam of half the pressure. A moderately-sized cylinder, carefully clothed, and a piston running at a high velocity, driven by 75 pounds of steam, cut off at one-fifth of the stroke, and slightly superheated, will give out a greater useful effect per pound of coal than nine-tenths of the condensing engines in every-day use in our manufacturing districts, while the first cost for foundations, piping, engine, and general fittings, will be reduced nearly one-half! The non-condensing engine has been hitherto underrated and treated with a contempt which it does not deserve. Had it received one-half the labor devoted to the condensing engine, it would now hold a very high position as a safe and economical motive power. We would willingly draw the attention of engineers to this class of machinery, convinced as we are that they will find in its improvement a fair and remunerative field for the display of their talents."

These remarks of our cotemporary relate to a most important question in which engineers and all who use steam power are deeply interested. But they are of most interest to marine engineers and the owners of steamships, because condensing engines are used exclusively on sea-going steamers and first-class steamboats. Condensing engines are more complex, cumbrous, and expensive than those of the high-pressure type. Why, then, are they not employed on steamships, when with them there would be less weight to carry, more room secured for cargo or passengers, and their first cost would be much less. There must be some reason for the general employment of the most costly, in preference to cheaper engines on steamers. It is not because high-pressure engines are less perfect in their construction, or their nature less understood than others; for those which are built for locomotives have attained to as great perfection as the best low-pressure engines on steamships. The fact is, the opinion is very prevalent, and it is based on science, that the condensing engine is the most economical of fuel, and fuel is one of the greatest constant expenses connected with the use of steam machinery. It is generally believed that it will do the same amount of work with at least one-third less fuel, and if this is the case, of course the first expense, although greater for the condensing engine, is of secondary importance. It is also generally believed that condensing engines secure greater safety, because steam of lower pressure is carried in their boilers. But this is not a valid reason in their favor, because boilers can now be constructed to secure as great safety in carrying one hundred pounds pressure, as boilers were formerly built to carry twenty pounds. The chief argument in favor of condensing engines is their economy of fuel compared with the other class; because the condenser removes the back pressure of the atmosphere with a very moderate expense of power; and it is also well known that pretty high-pressure steam may be carried in their boilers and the principle of expansion be carried out to great perfection in using the steam. But the idea heretofore generally entertained respecting the economy derived from working steam expansively is now denied to be correct. Chief Engineer Isherwood, U. S. N., in his testimony given lately in Washington, respecting the use of cut-off-gear for working steam expansively, is reported to have stated that there was only about 18 per cent difference between the best cut-off and no steam cut-off at all; and that this was the whole practical difference between using steam expansively and non-expansively. But Mr. Reeder, of Baltimore, a practical engine-builder, in his evidence asserted the contrary doctrine—namely, that economy was just in proportion to the extent of expansion. Here, then, after the steam engine has been applied to navigation for about sixty years, and after having attained to such great perfection in the construction of engines, we find engineers of high standing in their profession differing in opinion upon the very elementary principles of steam engineering. If there is no economy in condensers and in working steam expansively, then condensing and expansive-working steam engines are great absurdities, and their place should be supplied with simple, cheap, high-pressure engines without cut-offs or condensers. These disputed questions are certainly not difficult of solution, and it is the duty of professional engineers to solve them. Theory based on science accords great economy to the working of steam expansively, and if this is not secured in practice it is reasonable to suppose that there must be some imperfection in the practice.

USE PATENTED ARTICLES.

The efforts made by inventors to improve the character and efficiency of the several articles in daily use are worthy of remark and encouragement by the community in general. Nearly every department of practical life, whether in the store, household, office, or wareroom, bears evidence of the efforts of the class alluded to to lighten labor. The proof of this assertion may be found in the almost endless category of useful patented articles, which are, or should be, employed so universally. Of these we may mention cork-screws, boot-jacks, fire-shovels, lock-catches, stereoscopes, carriage-jacks, spring-heeled boots, skates, stamp cancelers, fountain pens and inkstands, copying presses, hay presses, and a host of others, to enumerate which would require the talent of an auctioneer. Let any business man note the facilities afforded by the new stamp cancelers, copying-presses, erasers, &c., and compare them with the old-fashioned cumbrous instruments for the purpose, and then ask himself if he would be willing to go back to the state of things which existed twenty years ago. Let every housekeeper ask herself also, whether she would be willing to dispense with clothes-wringers, washing-machines, &c, and twist her hands sore and her heart sick in the vain effort to do what a pair of rollers or a set of rubbers do in the tub, for both washing and cleansing the soiled linen of the family. The same self-examination may be held by every individual in the community with regard to almost everything in use.

The patent mark on an article is in some respects like the mint mark on a coin; it stamps it as valuable. There should be a more general inclination among the people to use patented articles. Inquire of your house-furnisher, lady readers, for the newest and best addition to the culinary or general housekeeping department, and you will doubtless be agreeably surprised by receiving something that is new to you, and which will materially lighten your cares.

Let every man also look about him and obtain the best instruments, tools, or what not, for carrying on his business, and he will have every advantage that it is possible to obtain. It is only by keeping up, or in fact a little ahead of the times, that one can hope to succeed; in these days when competition is so active, no means should be left unadopted to secure a prosperous business.

SELF-STOPPING GEAR FOR TOOLS.

It has lately become the practice for a certain class of machinists to affix self-acting gear to lathes and similar tools, so that when the carriage reaches a specified point, either the feed is thrown out and the carriage stops, or else both feed and lathe are stopped and the work thus saved from injury. This is a good plan and one that might be generally adopted with economy on every machine. Such an attachment would be cheap, and might save ten times its cost at times when either accident or carelessness had jeopardized the tools. It amounts to an insurance from damage upon the tool so fitted; and certainly any manufacturer who has paid for broken gears and brackets, or stripped nuts in the feeding apparatus, will acknowledge that anything which promises immunity from such disablement is worth attending to. It may be said that if a man pays attention to his business he is in no danger of breaking tools; but that is not a good argument against the adoption of preventives against loss; for accidents will happen in the best regulated shops, and after the wreck of machinery lays on the floor it is hard to look at it and say "This might have been guarded against by a little forethought and the outlay of a few dollars." Such attachments as we have advocated cost but little primarily, but may save large sums in repairs and rebuilding tools. In addition to these improvements much advancement has been made in adapting lathes and other machines to do work that has until recently been accomplished only by the use of several cutters shaped for a special purpose. As, for instance, the curves in the necks of connecting-rods, valve stems, &c.; also the octagons, or hexagons, which are sometimes formed upon the same parts of an engine. In some shops in this country these are done wholly by the lathe itself, automatically, it may be said, since the turner has nothing to do but to keep his tools sharp and the work running and the ends shape themselves, "rough-hew them" how the previous operator will.

These additions are also a safeguard against idleness on the part of shiftless men, for the lathe stops when the feed has reached a certain point; and if the turner be off gossiping or otherwise neglecting his duty, the result is shown by the action of the self-stopping arrangement and subsequent inaction of the tool. In many ways these simple attachments commend themselves, and employers, enterprising mechanics, and others, should see that their tools are so fitted without delay.

ECONOMY OF FUEL---SMELTING IRON.

A correspondent of the *United States Record and Mining Register* communicates a long article on the waste of coal used for smelting iron, and ridicules the construction of the common smelting furnaces; asserting that they are worthy of the days of Tubal Cain, who lived five thousand years ago. He states that two-and-a-half tuns of coal are employed to reduce one tun of iron from the ore, while one tun ought to be sufficient if properly managed. He confesses to a want of precise information respecting the art of smelting iron ore, but suggests that a saving of fuel might be effected with the use of the blow-pipe.

© 1863 SCIENTIFIC AMERICAN, INC.