

Since the gradual abolition of the cruel and infamous system of indenturing apprentices to masters a great improvement in the character of our workmen and the machinery they make has been manifested. Our machine shops, a few years ago, were full of English planers, slotting machines, compound planers, screw-cutting machines, etc. Now there are none imported. We can make better machines at much less cost at home. We can make them better and sell them in England at a lower price than they can be manufactured there. This statement is admitted by the London *Engineer*; (see *SCIENTIFIC AMERICAN*, page 297, Vol. IX., article "Energy and Aptitude of American Mechanics"); and this in spite of the fact that wages and iron are both higher with us than in England.

Our plan of educating youths in trades, as it exists at present, is the very best conceivable. The term "master," which is especially offensive to the American mechanic, is unknown, and the relation between the workman and his employer is that of good will and a disposition to work for mutual benefit. Instead of learning one branch the apprentice is put through each in turn, and the consequence is a more thorough knowledge of the trade. There is no eye-service in the present plan, and no compulsion; if a youth does not like his business or his employer, he puts on his coat and goes home, and neither carries off his victuals, his clothing, nor his schooling, for he has had neither. This course is the best for both, for every one knows that enforced labor is good for nothing, and a man who has to be watched to do his work is not worth watching.

The character of American machines and American mechanics, is higher to day than it ever was. There are no shops in Europe which turn out more perfect work than the establishment of Sellers & Company, in Philadelphia; A. M. Freeland, in New York; the Putnam Machine Company, in Fitchburg, Mass.; Browne & Sharpe, in Providence, R. I.; Portland Machine Company, in Maine, and hosts of others too numerous to mention; these are only noticed because we know their work; aside from this fact we have never spoken a word to any of their representatives.

English workmen are far behind our own, both in point of dispatch, accuracy of workmanship, personal cleanliness and moral character. We judge from the samples we see among us. They are arrogant, boastful, uneducated, and continually prating about "the Clyde," and what wonderful achievements are performed on that classic stream, or else eternally sounding the praises of Maudsley and Fields, Napier's, etc.—to the disgust of our mechanics, who think, not unreasonably, that what "Napier" may do or not do is of very slight importance. Let any man go into the shop of the Waltham Watch Company, where machinists of a high class are employed, and if he can find a cleaner, more intelligent, better dressed set of mechanics, write us word where they can be found, for we want to see them. Comparisons are invidious, however, and it is not in this shop alone that we are to look for steady, intelligent and active mechanics. New England is full of them; so are the other States; and the workshops of the North are the schools where men are taught patience, endurance, and manual dexterity.

In foreign countries you shall find the workmen congregated in beer shops, engaged in dog-fighting, or some low enjoyment. It is not so with us. There are few who do not spend their time in the development of some scheme to make fortunes, or, at the least, become their own masters. That would be a dark day for the trades when we should return to the bondage of signing indentures and making a trade something like punishment for an offense, instead of enlisting all the energies and sympathies of its members in its elevation. We have no fears for any such result, and so long as our present plan is in force will the character of American mechanics maintain its high standard.

#### INCORUSTATION POWDERS.

We have been many times solicited to pull this or that remedy for preventing deposits in boilers, but have never sanctioned the use of powders in general, for we have felt that an indiscriminate use of them was more likely to result injuriously than beneficially; moreover, cases are frequent where one particular

remedy is of no avail. The better plan is to remove the impurity before it enters the boiler, and that this can be done effectually will be seen by referring to the letters which we publish in another part of this paper. We have also given from time to time, in the columns of the *SCIENTIFIC AMERICAN*, a list of different articles to prevent scale from adhering, and we direct attention to page 107, Vol. IX., for information on this point. Most of the scale powders and nostrums of this sort are composed of the materials there spoken of, and can be bought in any drug store for one-fourth what is charged by agents for the same stuff.

#### DEFECT IN STEAM ENGINES.

Zealous professors of science occasionally call attention to the fact that steam, as a motor, costs much more than it should, and that little over one-tenth of the actual heating value of the fuel is realized in practice. Experiments and experience prove the statements to be virtually correct, and it is a reproach to the mechanical skill of the period that it should be.

The loss is not in the theory of the engine, for that is perfect, but in the practice of that theory; or, in plain terms, in the construction of steam engines. It is an undeniable fact, however, that but few of the steam engines now constructed work with the economy that they should, or even approximate in performance to the theoretical value of the fuel.

Portable engines are turned out by scores which, although well enough externally, are far from being in a healthy condition in those parts which affect economy. The slide valves are only such in name; they exercise few of the proper functions of this most important detail, and the boilers are heavy, enormously large in fire and heating surface, and every way disproportioned to the size of the cylinders. The feed pumps are poorly got up; the valves lift too much; the water passages are cramped and crooked, and the absence of any proper method for heating the feed water without creating more loss from back pressure on the piston than is gained by injecting hot water to the boiler is often noticeable. We make these statements for the interest of any it may concern—not to find fault. Many stationary engines are in precisely the same condition.

It is not the only thing required in a slide valve that it shall open and close the ports at a certain time, but that it shall be properly set for the work it has to do, that it shall exhaust the contents of the cylinder at the proper time, that it shall close properly, and that the lead shall be proportioned to the duty. That this is important every one is aware who has ever inspected, or is familiar with, indicator diagrams.

It is a common thing, on railways, to hear a locomotive exhausting "one-sided," as it is termed, or giving palpable public evidence that it is out of order and that the master-mechanic on the line is either indifferent or careless of his duties. We know of one road where our ears are daily saluted by the sound of a locomotive drawing a long train of coaches and regularly exhausting 1-2-3-4, 1-2-3-4, or with a very positive interval between the successive exhausts. It would be quite as sensible to draw two or three empty coaches, day after day, as it is to permit an engine to run in this way; for at every uneven or irregular interval, the steam is compressed or choked in the cylinder, and delayed in getting out until it acquires a high tension, so that the actual pressure is much greater on the exhaust side than on the steam side. This subtracts from the efficiency of the machine, adds to the cost of repair, of fuel and every thing used in running the engine. A locomotive engine, exhausting unequally, carries dead weight which costs a great deal to keep.

We know that engines are often regarded as in chronic or incurable difficulties, because some mysterious cause conflicts with setting the valves properly, but we have frequently found that individuals were more fond of declaring that the defect was very mysterious, than they were zealous to remedy it.

It is very plain, from the simple facts here cited—many of which are so well known among professional engineers as to be truisms—that one of the greatest obstacles in the way of economy in the steam engine is a want of mechanical accuracy in construction, erection and oversight; and that the cost of a

horse-power could be very much reduced by attention to obvious and well-known defects existing in steam engines.

#### The Pneumatic Dispatch Works.

The Pneumatic Dispatch Works, so far as regards the extension of the line from the Euston-square terminus of the London and North-western Railway to the Bull and Gate Station, Holborn, a distance of over a mile and a half, are nearly completed, and the tube will shortly be opened for the transmission of goods and parcels. The new tube is much larger than the first experimental one, and is about four feet high and four feet six inches in breadth. A commodious station has been erected near the arrival platform at Euston, and at the end of this there is an opening in the floor leading to the entrance of the large tube, which is laid beneath some of the busiest streets of the metropolis as far as Holborn Hill, near Hatton Garden, whence it will ultimately be extended to the General Post Office. The engine station, whence the system will be worked, is in the Bull and Gate Yard, Holborn, and the soil in this place had to be deeply excavated to find room for the tubes, which extend from beneath the street into the station, and lie at some depth below its upper works. At the extremity of the yard is the immense circular fan, composed of wrought-iron plates. This fan is a sort of disk containing numerous cellular compartments, with the divisions radiating from the axis of the wheel, the diameter of which is about twenty-two feet. The fan lies in a large chamber, and will be driven by two very fine engines, each of twenty-five horse-power, made by J. Watt & Co., of Birmingham. The machinery is already fixed, and the transit of goods, it is stated, will commence soon. Thus a goods traffic propelled by atmospheric power will be the next novelty for the metropolitan public.—*English Paper.*



ISSUED FROM THE UNITED STATES PATENT-OFFICE  
FOR THE WEEK ENDING JUNE 6, 1865.  
Reported Officially for the *Scientific American*.

Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the *SCIENTIFIC AMERICAN*, New York.

48,036.—Paper Bag.—James Arkell and Benj. Smith, Canajoharie, N. Y.:

We claim softening the upper parts of paper bags and making them pliable, substantially as and for the purpose above described.

48,037.—Stove.—Wm. Bamford and J. F. Tate, Jr., Milwaukee, Wis.:

We claim First, The air chamber, E, provided with one or more draft flues, L L, discharging into the main pipe or flue, D.

Second, The flues, L L, and pipe, I, in combination with an air chamber placed inside of a stove.

Third, The opening or pipe, H, when used for passing the outer air through a heated space and into an inner chamber, provided with flues, as specified.

Fourth, The air chamber, E, flues, L L, pipe, I, pipe or orifice, H, and register, G or F, in combination with the outer case or stove, A, each of said parts and combinations being substantially as set forth and specified.

48,038.—Pipe Coupling.—A. E. Barnard, Cleveland, Ohio:

I claim the cam, F, and boss, D, in combination with the lugs, d c, and opening, e, substantially as and for the purpose set forth.

Second, I claim the recessed chamber, F', packing, J, in combination with the coupling, substantially as and for the purpose set forth.

48,039.—Buckle Attachment.—Wm. E. Barton, East Hampton, Conn.:

I claim the metallic buckle fastening for fastening buckles to straps, constructed as described.

Also the said metallic buckle fastening, in combination with buckle and strap, substantially as described.

48,040.—Sleigh-bell Attachment.—Wm. E. Barton, East Hampton, Conn.:

I claim the within-described metallic bell-holder, cast of brass or suitable malleable metal, having a hole through it to secure the strap, impinging points on the strap side, and on the bell side prongs adapted to enter the bell through suitable holes therein, and hold the same by bending or clenching, substantially as set forth.

Second, The said bell-holder strap and bell, in combination when put together so as to hold the bell loosely and away from the strap, substantially as described.

48,041.—Composition for Lining Oil Barrels.—Jullus Baur, Brooklyn, N. Y.:

I claim the employment or use in a compound for lining petroleum packages of chloride of zinc and glue, made substantially as herein set forth.

Also the use in a compound for lining petroleum packages of chloride of zinc mixed with glycerin, as described.

Also a compound made of chloride of zinc, glue and glycerin mixed together, substantially in the manner and about in the proportion therein specified.