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Contents:

(Illustrations are indicated by an asterisk.)

THE POLICY OF STRIKES.

In an article in the New York *Sun* the following sensible paragraph appears:—

"The most effectual method for removing the disputes between capital and labor is by removing the too prevalent notion that there is an 'irrepressible conflict' between them. When workingmen and employers are convinced of the fact that there is a natural partnership between them, in which the former find the labor and the latter the money to carry on the business, and when they fully appreciate the necessity of harmony and concord under that partnership, then strikes or lock-outs will not disturb the 'channels of trade,' or interfere with the rights of every class of our citizens."

This is the view of all sensible people. Strikes are the legacy of a barbarous age—of the days when apprentices were bound—and in no wise a remedy for the evil they pretend to reach. Many well-meaning persons and journals have confused ideas on this subject, and are continually discussing and defending the *right* of men to strike. No one disputes the *right*, but the expediency of such a step. Strikes never bettered any trade; on the contrary, most have been injured by them. Ceaseless agitation of the question of pay has resulted in neglecting the trade itself. Wages forced up for a time by combinations come down again by degrees when the combinations are inactive, so that the last end of the strikers is worse than the first.

Strikes are generally originated by envious dissatisfied men, who, finding themselves falling behind their comrades in pay, create dissatisfaction in order to rise to popularity on the topmost wave thereof. We have always deprecated strikes, and shall raise our voice against them—not because, as has been insinuated by a silly paper, we are interested in reducing the earnings of our fellow-men, but because there is no benefit in the act; on the contrary, the greatest evils ensue. We hear enough in papers interested in fomenting discord between men and their employers about the grand success of such and such a combination, but they never tell us how ephemeral it is, or of the misery and sufferings of the families who want when the father is idle, or of the loose habits and false ideas engendered which fasten on him sometimes for life.

In this country the workman of to-day is often the proprietor to-morrow, and we can look back on many in the course of our experience who once ardently espoused the policy of striking, but now oppose it because of its fallacy. It is a hopeful sign of the times that, with all the demagoguism of the false friends of the workman, there are so few trades that lend an ear to their twaddle, but pursue the even tenor of their way to prosperity and peace, never dreaming that they are abused and downtrodden.

OPENING HOT SAFES.

We find this item in a Baltimore paper:—"The late conflagration at Richmond developed a curious incident and fact which may be valuable, if remembered. Some week or ten days after the fire, the iron safe of the *Enquirer's* office was opened, when immediately on the admission of the air, the books and papers were ignited and consumed. And such was the case of all other safes which were not in brick vaults. In these the contents were uninjured. The *Enquirer's* safe, at the time it was reopened, was cold externally to the touch."

It is very doubtful if the contents would have been preserved had the safes been allowed to become perfectly cold before they were opened. The fact that the books and papers took fire on the admission of air shows that the temperature was at the burning point, but paper is charred and reduced to tinder below the temperature at which it will burn. Any one who has a kerosene lamp may readily try this experiment, for it so happens that the temperature at the top of a kerosene lamp chimney is generally hot enough to char paper, but not enough to set it on fire. It is probable that the paper in these Richmond safes was decomposed, the hydrogen, nitrogen and oxygen being driven out, and mingled with a quantity of steam from the drying of the plaster in the safe walls—the carbon remaining as tinder. On the opening of the door these hot gases were swept out, and as the oxygen of the atmosphere came in contact with the hot carbon, the two entered into that swift combination which is combustion. The same non-conducting properties of the safe walls which enabled them to resist heat for a moderate period, caused them to retain it for so long a time after their interiors had become heated; hence their very slow cooling.

Practically, it might be better to let safes become perfectly cold before opening, because in many cases the paper would not be decomposed, and even if it were, satisfactory proof might in some cases be obtained of the destruction of notes, bonds, or other valuable documents, as writing or printing sometimes remains perfectly legible on paper after it has been reduced to perfect tinder.

The most valuable lesson, however, enforced by the condition of these Richmond safes, is the same that was so impressively taught by the great Troy fire, that iron safes are not to be intrusted with valuable documents unless they are inclosed in brick vaults.

ANOTHER STEP TOWARDS FLYING.

In the proceedings of the Polytechnic Association, published in our last number, was a description by Mr. Barbour of his carbonic acid engine, and he stated that he obtained one and a half horse power from an engine which weighed with all its auxiliary apparatus 450 lbs. This was the power obtained by following the piston with the full pressure only three-fourths of an inch in a stroke of twelve inches. There was also surplus weight in the engine, no effort having been made to reduce the weight to a minimum; the main reservoir was sufficiently thick to bear 5,000 lbs. to the inch, while the maximum pressure used was only 1,100 lbs.; and the reservoir was large enough to run the engine an hour and twenty minutes.

Now if an engine of the same form were made of aluminum, the weight would be reduced to about one-third, say 150 lbs., and then by following full pressure 3 inches instead of $\frac{3}{4}$ of an inch, the power would be materially increased, though, of course, the same supply of carbonic acid would not last as long. But if an engine could be driven for half an hour, this would be sufficient to travel thirty miles, going at the rate of sixty miles an hour. It would seem, therefore, that it is in the present power of the arts to construct an engine of $2\frac{1}{2}$ or 3-horse power that will not weigh more than 150 pounds. Will these conditions enable us to fly?

A sand hill crane weighs 40 pounds, and it does not seem possible that three sand hill cranes can have the muscular power of one horse; at the first view, therefore, there would appear to be sufficient encouragement for a further examination of the question.

If we allow 180 lbs. for the weight of a man, the whole weight of a machine and its burden will be 330 lbs. If with this weight we have a machine of two-horse power, and if one-half the power be expended in moving the air and the other half in raising the machine, it will rise vertically 100 feet per minute. When sufficient altitude is attained the machine may be inclined, and a portion of the power previously expended in rising may be employed in horizontal propulsion.

Notwithstanding all that has been said to the contrary by our correspondents, a revolving spiral fan would probably be the proper form for the wings, especially as this would be the easiest way in which to obtain the high velocity requisite. It is generally stated that the resistence of the air to a body passing through it increases with the square of the velocity, but Morin says that for very high velocities the formula must contain an element increasing with the cube of the velocity. Calculating, however, an increase only in proportion to the square of the velocity, from the data furnished by Rouse's experiments, a surface 1 foot square moving with a velocity of 146 feet per second, will experience a pressure of 49 lbs. With 6 revolutions per second—360 per minute—to obtain a velocity of 146 feet per second, the fans must be 8 feet in diameter—each arm 4 feet long. As but half the pressure would be available for raising the machine, we should require a total pressure on the air of, say 700 lbs., and this, at 50 lbs. to the foot, would require an area of 14 feet. As there would be two fans with two arms each, this would give an area of $3\frac{1}{2}$ feet to each arm—less than $2\frac{1}{2}$ feet long and 18 inches wide. It will be seen that all the dimensions and velocities are within practicable limits.

The only plan for navigating the air that has any hopes of success is that of flying—beating the air with wings driven by mechanical force; and certainly no machine heretofore proposed comes so near possessing the requisite power in proportion to its weight as a carbonic acid engine constructed of aluminum.

TRAINING UP MECHANICS.

Many years ago a system of apprenticeship prevailed in this country by which youths were bound for a term of years to a master, who agreed to provide instruction in his trade, board, clothes and tuition in return for their services, and, for a portion of the time, pecuniary reward.

We have never heard of any legislation on the subject, but for reasons which are quite apparent the system exists no longer, and youths, instead of being bound, make a verbal agreement to serve out the stipulated period, whatever that may be. To the credit of our young men, but few instances occur where they forfeit their word. The old plan was open to many objections, so many that the evil wrought its own cure, and our shops are purged of it forever. In many cases hard masters starved their apprentices, half clothed them, gave them no schooling, and educated them only in such branches of the trade as they chose, lest in the future they might become rivals and so spoil the business by too great competition.

It was not in human nature to be so treated and not rebel, and if any reader is curious in these matters let him turn back to files of papers, published twenty years ago, and he will find small cuts of a man with a bundle slung over his shoulder on a stick, and an advertisement reading—"One cent reward! ran away from the subscriber an indentured apprentice." What wonder that they ran away? The world does not stand still; and so flagrant were the wrongs alluded to, that, by common consent, the system has been abolished. The times were out of joint. "The Idle Apprentice" is the subject of a series of the most celebrated cartoons of Hogarth, and the idle apprentice of that time was the indentured apprentice, who received blows instead of food, and curses in lieu of instruction. There were few inventions in those days; not because mankind were more degenerate, but because there was no incentive to exertion, and it was much harder then than it now is to introduce any labor-saving machine.

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-rs, 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.

INCRUSTATION POWDERS.

We have been many times solicited to puff 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 valve 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 makin 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.—Julius 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 herein specified.