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Contents:

(Illustrations are indicated by an asterisk.)

VERSATILITY AND SKILL OF AMERICAN MECHANICS.

A recent paragraph in a contemporary asserted that mechanics in this country were slovenly in their execution and that they only half-learned their trades; as a consequence, the credit of manufacturers and of the nation suffered. The originator of this slander could have had little acquaintance and no sympathy with our working-men. If he had circulated among them as we have been with them in their workshops, their homes and places of amusement—if he had identified himself with their feelings, and thoroughly understood their characters, he would have thought twice before publishing his untruthful assertions, or, better still, erased them before the ink was dry upon the paper. He would have stifled the slander in its birth, before sending it out to prejudice us among other nations, all too ready to disparage everything American.

The assertion is not true. American workmen are, at home certainly, notorious for their skill, thoroughness and versatility. They are fertile of resource, quick to foresee difficulties and avoid them, and the record of the Patent Office is the fullest proof that they are untiring and incessant in their efforts to improve themselves. And not this alone, but to regenerate society, in one sense, by increasing and cheapening the product of labor.

In any machine shop, we shall find men who can work at the vise, the lathe, planer, slotting-machine, shaper, foot-lathe, screw-cutter, boring-mill or gear-cutting engine, with skill and exactness, and who could transfer themselves from a machine they knew by heart, so to speak, and run another on wholly different principles after two minutes' inspection—men who can make a lathe or a knitting-machine, a steam-engine or a plow-share, and who not only know how to use tools, but also make them, and can forge and temper sufficiently well for all practical purposes.

A Jack-of-all-trades is master of none, but such men are not "Jacks," they are masters of their *own* trade, and know it from *alpha* to *omega*. Army officers—those educated at West Point, for example—have had occasion to test the truth of these assertions severely, and railroads that have been cut, or captured, have been put in running order in a few hours notwithstanding the efforts of the rebels to disable them by carrying off important parts of the machinery.

Captured blockade-runners are taken in charge by our acting engineers, and brought home without delay, despite the fact that the engines are new to our men. Those persons who innocently suppose steam-engines are all alike cannot appreciate the care, anxiety, and responsibility which attends the prize-engineer in bringing a strange vessel home; but we do, and have often wondered that these men have been so uniformly successful in their efforts.

Go into any cabinet-maker's shop in the country and ask to have a small pattern made for the foundry, and there is no doubt but that the piece will be obtained, and of first-rate workmanship; yet cabinet-making and pattern-making are widely different trades. Our mechanics in small towns will execute any job, from putting up a building to repairing an obstinate pump, and whole communities depend upon one man sometimes to supply their necessities in this respect.

To return to the machine shop again. Contracts to do different parts of steam-engines, or sewing-machines are eagerly sought for by our workmen. How well they are executed let the machines and the demand for them answer.

It is needless to pursue the subject further. Those who honor and respect labor, who deem the workman worthy, not only of his hire, but of sympathy, esteem and encouragement, will leave no effort untried to elevate him in public estimation, or defend him from the aspersions of ignorant or malignant (because ignorant) individuals.

MOLASSES.

Every one of our readers has probably observed the hygroscopic property of molasses. When molasses candy is first made it is dry and brittle, but if it lies a few hours exposed to the air it becomes soft, sticky, and limber; this results from its hygroscopic property—its affinity for water—its absorption of moisture from the atmosphere. When the little cakes, called ginger snaps, are taken from the oven, they cannot be bent without breaking, but in the course of a day the molasses which they contain absorbs so much water from the air as to make them moist and soft.

It is possible that a valuable patent might be secured for some mode of protecting sticks of molasses candy from the action of the atmosphere, and thus preserving them in their dry and brittle condition. Perhaps a thin coating of gum-arabic, or other edible gum, might answer the purpose.

Molasses is used in the making of printer's rollers, its hygroscopic property preventing the rollers from drying. It is probable that if more general attention was called to this property of molasses, many other applications might be found for the substance. For instance could not a small proportion of it be used in the composition of sculptors' clay, to prevent the great labor and care required in keeping the clay moist while the artists are forming their models?

In the laboratory the substances most frequently employed to absorb water are the chloride of calcium, quicklime, and sulphuric acid, all of which are highly hygroscopic. Quick-lime is also used in distilling to extract from the alcohol a portion of the water which cannot be separated by the process of distillation.

FINANCIERING.

There is an impression, almost amounting to a superstition, that financiering is a difficult and mysterious art. It is, in truth, the simplest of all the departments of commerce. Laying aside all technical terms, financiering is nothing more than the art of borrowing money. There are but two steps in the transaction; the first is to find some person with money to lend, who is satisfied with your securities; and the second is to agree upon the rate of interest.

The poor washerwoman who "spouts" one of her kettles at the pawnbroker's goes through both steps of financiering, and the process is no simpler than that of the merchant who has a note discounted at the bank. If the washerwoman pawns the clothes of one of her customers, trusting to redeeming them by pawning the clothes of the next customer, she makes an operation which is very closely parallel to that most mysterious of all financial operations—"kite-flying."

General Jackson remarked, that "men who do business on borrowed capital ought to fail." Though this hard-hearted maxim has been denounced beyond measure, it certainly has the sanction of Providence, for they nearly all do fail. The statistics of General Dearborn show that out of every hundred men who do a credit business, ninety-seven become bankrupt. Famous financiers are especially certain to fail. We never knew one, from Nicholas Biddle down, who did not finally run out. The really shrewd and thrifty men, such as A. T. Stewart and James Gordon Bennett, never have any occasion to borrow money—to financier. Financiering is simple—and they are simple who practice it.

MAKE HASTE SLOWLY.

There is an old Latin proverb (*Festina lente*) which says, "hasten slowly." It is rarely that we find two words which express so much or contain more food for thought. As a nation we make haste too fast, and should do better to go much slower and more surely to our goal. Some individuals manifest this disposition to hurry over important things differently from others, but the application of the fault alluded to may be understood by the following illustration:—Suppose a person to require information upon some subject he is comparatively ignorant of—the steam engine indicator, for instance; having procured a book upon it, he runs his eye over page after page, touching first upon this example, now upon that, until he arrives at the end, when he knows nothing whatever of the subject. The first time he undertakes to converse upon the instrument or to apply its principles practically, he discovers his ignorance, and is put to shame or inconvenience. All this is wholly the fault of making haste to reach the end, without grasping the fundamental principle and mastering it, and each detail also, before going further. It is absurd to suppose that any matter worthy of study can be mastered in a cursory examination, yet very many persons relinquish the pursuit of knowledge in despair from this very cause. Finding it impossible to comprehend in fifteen minutes some point it has taken an author as many days, and weeks, probably, to settle, they deem the matter beyond their comprehension, and throw up the study never to return to it.

There may be some gifted spirits to whom the knotty points of a new theory or the intricacies of an unfamiliar science, are clear and plain at first sight, but the mass acquire knowledge only by patient study, not by a hand-gallop through the fields of learning.

When sensible men go abroad to acquire information in foreign countries they do not take express trains and steamboats, and whirl onward to the end, but staff in hand they penetrate into village and hamlet, and learn from the peasant and the prince. So it is with those who study to learn and retain what they read. Patient plodding by the wayside is better than running from pillar to post, and the truth of this assertion is manifest to all who have ever given the subject attention.

APPEARANCE OF THE SUN FROM THE NORTH POLE.

To a person standing at the north pole the sun appears to sweep horizontally around the sky every twenty-four hours without any perceptible variation during its circuit in its distance from the horizon. On the 21st of June it is 23° 28′ above the horizon, a little more than one-fourth of the distance to the zenith, the highest point that it ever reaches. From this altitude it slowly descends, its track being represented by a spiral or screw with a very fine thread, and in the course of three months it worms its way down to the horizon, which it reaches on the 23d of September. On this day it slowly sweeps around the sky with its face half hidden below the icy sea. It still continues to descend, and after it has entirely disappeared it is still so near the horizon that it carries a bright twilight around the heavens in its daily circuit. As the sun sinks lower and lower, this twilight gradually grows fainter till it fades away. On the 20th of December the sun is 23° 28′ below the horizon, and this is the midnight of the dark winter of the pole. From this date the sun begins to ascend, and after a time his return is heralded by a faint dawn which circles slowly around the horizon, completing its circuit every twenty-four hours. This

dawn grows gradually brighter, and on the 20th of March the peaks of ice are gilded with the first level rays of the six-months' day. The bringer of this long day continues to wind his spiral way upward, till he reaches his highest place on the 21st of June, and his annual course is completed.

THE MONITOR SYSTEM.

Mr. John Ericsson has written us a letter in which he positively refutes the statements that have appeared in some of the daily papers, and which have been re-echoed abroad, concerning the inefficiency, cost, and general worthlessness of the monitor system.

Captain Ericsson states truly that we have been able to put a fleet of iron-clad ships afloat without one dollar of expense for experiments. The total cost of the monitor fleet now afloat is very little over $12,000,000. The English experiments with the Armstrong breech-loader and other ordnance (which by late English advices appear to have been condemned), cost more money than this.

It is also claimed that the latest experience with these vessels at sea completely disproves the assertion that they are unseaworthy. The report that the monitors cannot use their guns in a sea-way, or open their ports is not correct. The mechanical arrangement provided to permit the ports to be opened can only be used on the turreted ships and not on broadside iron-clads. The *Dictator* can carry coal enough to go to St. Petersburgh, Russia, if necessary, and with 800 tuns of water in her coal-bunkers and ready for steam, her gun-wale is four feet above water.

Captain Ericsson concludes by saying that the European Powers are well aware of the value of the monitor system, and that two fleets of iron-clads, *precisely* like ours are now being built on the Baltic sea; one on the eastern and the other on the western slope.

WAGES PAID FOR SKILLED LABOR.

Workmen and laborers are now receiving comparatively high wages in this city, or what would have been high had the price of provisions, etc., remained at reasonable figures. As it is, the compensation is small, and we shall doubtless hear of interruptions until the prices are adjusted more equably. Even now there is discontent, and we advise all those workmen who have good steady employment to remain where they are, as there seems to be plenty of men here now in most branches of trade.

Machinists, vice hands, receive on an average $2·70 per day of ten hours, overtime extra; metal-turners, $2·80; moldera, $2·80; coppersmiths, $3; pattern-makers, $2·80; blacksmiths, $2·90; painters, $2·25; carpenters, $2·50; boiler-makers, $2·75 to $3; printers, on daily papers, consider it a poor night's work if they do not make $5—their work being paid for by the 1000 ems—but the average pay by the week is $16; conductors on our city cars receive $2 for twelve hours' work, and there are too many applicants seeking for the places.

These prices, it will be remembered, are not the outside, but the average rates. Very many machinists receive $3 and upwards, but they are extra good workmen. We have given the prices as they are paid in our large machine-shops.

REBEL IRON-CLADS.

The *World* publishes a long account of what it calls "a formidable rebel iron-clad;" said iron-clad, consisting of railroad iron, as usual, laid in tiers one after the other. It has somehow happened that the rebel iron-clads cannot find a favorable opportunity to sink our wooden vessels, and, notwithstanding their tremendous powers of offense, they prefer the certainty of safety in port to the certainty of being sunk if they venture to attack us. A fourth-rate wooden gun-boat (the *Sassacus*) recently drove one of these terrible iron-clads back to her dock, and, although we frequently hear of the existence of more of these dangerous crafts, we fortunately escape being sunk by them.

There are no formidable rebel iron-clads in existence, nor will there ever be, so long as railroad iron is used to plate them with.

THE HECKER AND WATERMAN EXPERIMENTS.

In our last number we published an account of four series of experiments of 30 hours each, the steam being cut off at different points in the stroke. In that account we gave the most important elements in the experiments, but as intelligent engineers may like to know some of the other conditions, we complete this week the history of the experiments by a statement of all the observations which were not given in our last issue, together with the calculations of the fuel and water consumed, and work done per hour and per minute.

The mean revolutions of the fan per minute during each 30-hours run were with—

⅞ths cut-off	68·45
⅔ds cut-off	68·4
½ cut-off	68·34
¼th cut-off	68·41

The consumption of fuel per square foot of grate surface per hour was with—

⅞ths cut-off	9·000
⅔ds cut-off	7·80
½ cut-off	7·380
¼th cut-off	6·710

The pressure of steam in cylinder at point of cut-off was given last week; the mean pressure in the cylinder at end of stroke was with—

⅞ths cut-off	24·042
⅔ds cut-off	19·184
½ cut-off	18·170
¼th cut-off	14·846

The total horse-power developed by the engine per indicator, including overcoming back pressure against piston, was with—

⅞ths cut-off	11·752
⅔ds cut-off	11·639
½ cut-off	12·121
¼th cut-off	11·682

The mean back pressure against the piston during its stroke, in pounds, was with—

⅞ths cut-off	4·05
⅔ds cut-off	4·87
½ cut-off	3·83
¼th cut-off	3·37

The gross *effective* horse-power, per indicator, was with—

⅞ths cut-off	10·079
⅔ds cut-off	9·631
½ cut-off	10·509
¼th cut-off	10·288

The net horse-power applied to fan was with—

⅞ths cut-off	8·839
⅔ds cut-off	8·392
½ cut-off	8·889
¼th cut-off	9·049

The pounds of feed-water consumed per hour, per total indicated horse-power, were with—

⅞ths cut-off	47·140
⅔ds cut-off	42·904
½ cut-off	40·063
¼th cut-off	36·691

The pounds of combustible consumed per hour, per total indicated horse-power, were with—

⅞ths cut-off	5·525
⅔ds cut-off	4·822
½ cut-off	4·309
¼th cut-off	4·143

Temperature of feed water, with—

⅞ths cut-off	108·22
⅔ds cut-off	107·15
½ cut-off	107·15
¼th cut-off	104·42

Temperature of water discharged by the air-pump, with—

⅞ths cut-off	111·26
⅔ds cut-off	110·03
½ cut-off	110·07
¼th cut-off	107·56

Vacuum in condenser in inches of mercury, per open gage, with—

⅞ths cut-off	26·25
⅔ds cut-off	26·67
½ cut-off	26·53
¼ths cut-off	26·01

These facts, with those published last week, will enable the lesson of this series of experiments to be fully understood. Next week we shall give the history in full of another series.

Sailing of the "Fire Queen."

On Saturday, July 9th, the splendid new steamer *Fire Queen*, Capt. Henry W. Johnson, commander, sailed from this port *via* St. Johns for Shanghai, China. Among the passengers was Mrs. Johnson, the commander's beautiful young wife, who, for a second time, accompanies her husband to the Chinese Empire. The *Fire Queen* is the fifth steamer built by Capt. Johnson for the Chinese trade, and she is a very superior first-class vessel, 300 feet in length. Her arrangements and decorations are superb, and if she reaches her destination in safety—of which there is but little doubt under her experienced commander—we think she will astonish the natives of the Celestial Empire somewhat. The best wishes of the many friends of those on board attend them on their long voyage.

It is said that five hundred men are now hard at work on both ends of the Hoosac tunnel.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JULY 12, 1864.

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☞ 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.

43,466.—Process for treating Hair.—William Adamson, Philadelphia, Pa.:

I claim simultaneously drying and deodorizing the hair of hogs and other animals by subjecting it to the direct action of the products of combustion of coal or other fuel, substantially in the manner described.

43,467.—Machine for Spinning and Reeling.—George Albright, Oskaloosa, Iowa:

I claim, first, The movable frame, B, carrying a series of spindles, C, in combination with the rising and falling clove-frame, G, reel, I, and with a recess in the top cross-bars, c c', of the main frame, A, and pins, n, projecting from the front side of said main frame, all constructed and operating in the manner and for the purpose substantially as herein shown and described.

Second, the adjustable clasp, l, in combination with the rising and falling clove-frame, G, and spindle frame, B, construct d and operating in the manner and for the purpose substantially as set forth.

[This invention consists in a movable frame containining a series of spindles so arranged that it can be changed from a horizontal to a vertical position in combination with a vertically sliding clove frame and with a reel in such a manner that when such movable frame is brought in a horizontal position, the spindles are properly situated for spinning, and if the movable frame is brought in a vertical position, the spindles are properly situated for reeling.]

43,468.—Hydraulic Machine for washing Ore.—Joseph M. Allinwood, Timbuctoo, Cal.:

I claim, first, The insertion of the diaphragms or guides, inside of the pipe for preventing the water from forming a spiral column or stream at the instant of discharge;

And secondly, The combination of the parts set forth accompanying this specification, constituting a new and improved machine.

43,469.—Metallic Sole-plate for Boots and Shoes.—Francis W. Bacon, Jersey City, N. J., and Solon Dike, New York City:

We claim a corrugated steel or metal shank and plate with a counter turned up around the heel at any desirable height, and all from the same piece of metal as shown in Figs. 1 and 2.

43,470.—Cultivator.—Frank Barney.—Bloomington, Ill.:

I claim the hand lever, H, with its swivel fulcrum, K, in connection with the crank shaft, G, hinged rear standard, E, and swivel front standards, E', all constructed and operating in the manner and for the purpose substantially as herein specified.

43,471.—Valve Gear for Steam Engines.—Henry and Frederick J. L. Blandy, Zanesville, Ohio:

We claim the method of connecting the valve rod, a, with the eccentric strap, G, by means of the off-set arm, c, diagonal brace, I, and rod, H, forming a frame which is jointed to the end of the valve rod substantially as described and represented.

[This invention consists in an improved arrangement of the valve chest and valve, and of the connections between the valve rod and eccentric, whereby the power to drive the valve is transmitted in a more direct manner. The invention is applicable with more especial advantage to horizontal engines on which the valves are on the top of the cylinder, in which case it dispenses with the rock shaft commonly used in such engines.

43,472.—Sorghum Evaporator.—Caleb Bond, Richmond, Ind.:

I claim, first, The combination of the furnace, A, and the flues, D D', E E, one above the other with the dampers, a b c, and d d' d'', by which the heat is thrown at will against both, either, or neither of the pans, or against a smaller or larger portion of the rear pan, and at the same time avoid or infringe upon the forward pan.

Second, The vertically adjustable wooden rail, f, provided with hooks, f', in combination with the pan, G, as described for the purpose of attaching and operating a bag containing some clarifying materials.

[This invention relates to certain improvements in the means for regulating the draught and directing the heat in an apparatus for evaporating saccharine juices in a manner that either of the pans or both can be heated to any desired degree or cooled off at the pleasure of the operator, simply by changing the position of a few dampers, and without increasing or diminishing the fire. It also relates to certain improved means for removing the scum and clarifying the juice.]

43,473.—Musical Demonstrating Board.—Wm. H. and Geo. W. Bowlsby, Monroe, Mich.:

We claim, first, The sliding-bars and scales, B B, with their attachments, c c, and d d, in combination with the enharmonic scale diagram, G.