

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. Petersburg, Russia, if necessary, and with 800 tons 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; molders, \$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—

$\frac{1}{2}$ th cut-off.....	68.45
$\frac{3}{4}$ th cut-off.....	68.4
$\frac{1}{2}$ cut-off.....	68.34
$\frac{1}{4}$ th cut-off.....	68.41

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

$\frac{1}{2}$ th cut-off.....	9.000
$\frac{3}{4}$ th cut-off.....	7.80
$\frac{1}{2}$ cut-off.....	7.80
$\frac{1}{4}$ th 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—

$\frac{1}{2}$ th cut-off.....	24.042
$\frac{3}{4}$ th cut-off.....	19.184
$\frac{1}{2}$ cut-off.....	18.170
$\frac{1}{4}$ th cut-off.....	14.846

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

$\frac{1}{2}$ th cut-off.....	11.752
$\frac{3}{4}$ th cut-off.....	11.639
$\frac{1}{2}$ cut-off.....	12.121
$\frac{1}{4}$ th cut-off.....	11.682

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

$\frac{1}{2}$ th cut-off.....	4.05
$\frac{3}{4}$ th cut-off.....	4.67
$\frac{1}{2}$ cut-off.....	3.83
$\frac{1}{4}$ th cut-off.....	3.37

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

$\frac{1}{2}$ th cut-off.....	10.079
$\frac{3}{4}$ th cut-off.....	9.631
$\frac{1}{2}$ cut-off.....	10.290
$\frac{1}{4}$ th cut-off.....	10.283

The net horse-power applied to fan was with—

$\frac{1}{2}$ th cut-off.....	8.839
$\frac{3}{4}$ th cut-off.....	8.342
$\frac{1}{2}$ cut-off.....	8.889
$\frac{1}{4}$ th cut-off.....	9.049

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

$\frac{1}{2}$ th cut-off.....	47.140
$\frac{3}{4}$ th cut-off.....	42.904
$\frac{1}{2}$ cut-off.....	40.063
$\frac{1}{4}$ th cut-off.....	36.691

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

$\frac{1}{2}$ th cut-off.....	5.525
$\frac{3}{4}$ th cut-off.....	4.222
$\frac{1}{2}$ cut-off.....	4.309
$\frac{1}{4}$ th cut-off.....	4.143

Temperature of feed water, with—

$\frac{1}{2}$ th cut-off.....	108.22
$\frac{3}{4}$ th cut-off.....	107.15
$\frac{1}{2}$ cut-off.....	107.15
$\frac{1}{4}$ th cut-off.....	104.42

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

$\frac{1}{2}$ th cut-off.....	111.26
$\frac{3}{4}$ th cut-off.....	110.03
$\frac{1}{2}$ cut-off.....	110.07
$\frac{1}{4}$ th cut-off.....	107.56

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

$\frac{1}{2}$ th cut-off.....	26.25
$\frac{3}{4}$ th cut-off.....	26.67
$\frac{1}{2}$ cut-off.....	26.33
$\frac{1}{4}$ th 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.

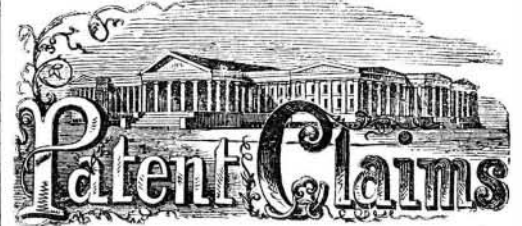
Sailing of the "Fire Queen."

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—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.

HOW TO TURN GREENBACKS INTO GOLD.—Send three dollars of them to this office and thus enjoy a year's subscription to the SCIENTIFIC AMERICAN. Ten to one that the information you thus obtain will result in bringing into your coffers, before the year is out, a hundred times more money in gold, than the amount of your first investment.

MESSRS. HURD & HOUGHTON, 401 Broadway, New York, have sent us a copy of a neatly-bound pamphlet containing the evidence given in the *Chenango* boiler explosion. Every engineer should send for a copy of the work, as it contains a great deal of information.



ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING JULY 12, 1864.

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.

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-bar, 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, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in a movable frame containing 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 method of connecting 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 offset arm, c, diagonal brace, l, 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', 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.