March 3, 1837, and entitled "An Act in addition to an Act to promote the progress of Science and Useful Arts," requires the Commissioner "to report annually to Congress, in the month of January, a list of all patents granted during the preceding year, designating under proper heads the subjects of such patents, and furnisbing an alphabetical list of the patentees, with their places of residence; also a list of all patents which shall have become public property during the same period, together with such other information of the state and condition of the Patent Office as may be useful to Congress and the public."

The 4th section of the Act of Congress, approved March 3, 1859, and entitled "An Act making Appropriations for the Legislative, Executive and Judical Expenses of Government for the Year ending the thirtieth of June, 1860," provides that "the Secretary of the Interior be, and he is hereby directed to cause the annual report of the Commissioner of Patents, on mechanics, to be hereafter made to the Senate and House of Representatives, to be prepared and submitted in such manner as that the plates and drawings necessary to illustrate each subject shall be inserted so as to comprise the entire report in one volume not to exceed 800 pages."

It will be observed, from the foregoing provisions of the law [of 1837], that the Commissioner is required to report annually to Congress:—1st, A list of all patents granted during the year preceding, and an alphabetical list of the patentees, with their places of residence; 2d, A list of all patents which shall have expired during the preceding year; 3d, Plates and drawings to illustrate each subject; 4th, Such other information of the state and condition of the Patent Office as may be useful to Congress and the public. Every effort has been made to limit the rise of the mechanical report, so that it might be embraced within 800 pages, as required by the law [of 1859]; but this is found to be a physical impossibility. The list of patents expired and granted during the year 1859 will occupy about 260 pages of the printed report; the drawings or plates necessary to illustrate each subject will require about 340 pages; while the claims and descriptions necessary to explain the drawings, and without which the report would be utterly worthless, will require about 1,200 pages more. This information, which is required by law to be reported, cannot therefore be published in less than 1,800 pages. We have thus been reluctantly compelled to present a report exceeding the limit prescribed by the last Congress by 1,000 pages, and have no doubt but that Congress, in view of these facts, will so modify the law that future embarrassments of this kind may not arise. Nothing is embraced in this report but such information as is believed to be absolutely necessary to enable Congress and the public to understand the condition of the Patent Office, and the character of the inventions which have been patented during the last year, while even this is condensed into the smallest space that the nature of the case will admit.

The Act of Congress approved February 5, 1859, entitled "An Act providing for keeping and distributing all Public Documents," authorized and directed a transfer of all matters pertaining to copyrights from the State Department to the Department of the Interior. The Secretary of the Interior has very properly placed this matter under the immediate supervision of the Commissioner of Patents. It therefore becomes my duty to call the attention of Congress to this subject. The object of the copyright law is to protect authors in the exclusive ownership and control of their own literary productions, in a similar manner to that by which inventors of mechanical improvements are protected in the exclusive enjoyment of their own new and original inventions. The law now requires a person who may desire to secure the benefit of a copyright, to make his application to the Clerk of the District Court of the United States for the district in which the applicant resides. The Clerk of the District Court is directed to keep a record of all such applications, and to transmit (at least once in each year) to this Office a certified list of such records and of all copies of books or other works deposited in his office in accordance with the provision of the copyright law. The copies of records and books, &c., thus received are to be preserved in this Office. The only fee paid by the person to whom a copyright is granted is a fee of fifty cents to the Clerk of the District Court; no provision being made by which the necessary expenses incurred by this Office, in taking charge of and preserving the records and books, are to be paid by them for whose benefit this law was established. I see no good reason why authors should not be required to pay these expenses in the same manner that inventors are required to pay the expenses incurred in transacting their business before this Office. Neither can I discover any good and sufficient reason why applications for the benefit of the copyright act should not be made direct to this Office instead of being made to the Clerks of the United States Courts. It is found to be impossible to conduct the business with uniformity and accuracy under the present system. This evil must necessarily continue to exist as long as the execution of the law is committed to the hands of so many different persons in various sections of the country. The law should therefore be amended in such a manner as to remedy this objection. The amount of fees to be paid by those who desire to avail themselves of the benefit of the copyright law should also be sufficient to meet the necessary expenses of the officer in attending to that particular branch of the public business.

WM. D. BISHOP.

Hon. John C. Breckinridge,
Vice-President of the United States.

AMERICAN NAVAL ARCHITECTURE.

Naval pre-eminence secures universal dominion over the wealth of the world; since whoever commands the sea commands commerce, and whoever controls the traffic of the nations commands the riches, the liberties and the happiness of the world. The superior qualities of American merchant ships are causing them to fast supplant the mercantile navies of every other nation, and our vessels are rapidly becoming the carriers for people of every clime. As much of the commercial greatness of the United States is due to our ship-builders and navigators, it will therefore, at all times, give us much pleasure to publish such written communications from practical men of the above class as we may deem conducive to the enlightenment of our readers, in regard to the progress of improvements designed to promote the advancement of maritime science, and in accordance with this resolution, we will now proceed to detail the general construction and peculiar points of three recently-completed vessels, which are considered to exhibit, in many respects, marked evidences of that excellence which always results from a perfect coincidence of action between the designing mind and the executing hand.

THE STEAMER "GEORGE ANNA."

This vessel has just left the hands of her builders, and will at once take her appropriate place on the route of her intended service, which is between the ports of Baltimore and Richmond, and occasionally to this city. Her dimensions, with particulars of engines and boilers, are given in detail below:—Length on deck, from fore-part of stem to after-part of stern-post, above the spar deck, 208 feet 6 inches; breadth of beam (molded), at midship section above the main wales, 30 feet; depth of hold, 10 feet 3 inches; depth of hold to spar deck, 18 feet, 3 inches; draft of water at load line, 6 feet; dimensions of engine space, 60 feet 4 inches; area of immersed section (at load draft of 6 feet) 169 square feet; tunnage, 574.

The *George Anna* is fitted with a powerful vertical beam engine; diameter of cylinder 44 inches; length of stroke of piston, 11 feet 6 inches. Diameter of paddle-wheels (over boards) 28 feet 2 inches; length of blades, 8 feet 3 inches; depth, 1 foot 10 inches; number of blades, 20.

She has one return tubular boiler, the length of which is 14 feet 6 inches; breadth of same, 14 feet; hight (exclusive of steam chimney) 11 feet 6 inches; and beneath this there are five furnaces—breadth 3 feet 6 inches, and 2 feet 6 inches; length of fire-bars 6 feet. There are 154 tubes above; number below, 4 arches. Internal diameter of tubes above, $3\frac{3}{4}$ inches; internal diameter of arches below, same of furnaces; length of tube both above and below, 5 feet 8 inches; diameter of chimney, 4 feet 6 inches; hight of same (above grate), 46 feet 3 inches.

The weight of her engine is 210,000 pounds; that of her boiler, with water, is 90,000 pounds; load on safety valve, per square inch, 30 pounds. She possesses a heating surface equal to 2,114 square feet, and, will consume $\frac{3}{4}$ of a tun of coal per hour. The maximum revolutions per minute, at above pressure of 30 pounds, are 22; and steam is cut off at one-half stroke; draft forward, 6 feet; draft aft, 6 feet.

The frame is of wrought iron plates, $\frac{1}{2}$ to $\frac{3}{8}$ of an inch in thickness; and they are fastened with $\frac{5}{8}$-inch rivets between every 2 inches; shape of frame I, 3 inches in depth by $\frac{3}{4}$ of an inch in width, and the same are 18 inches apart at centers. The number of strakes of plate, from keel to gunwale, are 11; the cross floors are 13 in number, and 18 inches in hight; they are molded at the throats 3 inches, sided $\frac{3}{4}$ of an inch, with angle iron on top, and shaped I; shape of keel U, and dimensions of same, 6 inches by half an inch. Her bunkers are made of iron. The boiler is located in the hold, and is protected from communicating fire by felt and iron; she does not use blowers.

This vessel has three water-tight bulkheads, a commodious promenade deck, and a large saloon cabin; also water wheel guards fore-and-aft. Her ceiling is of pine, $1\frac{1}{2}$ inches thick. She is fitted with one independent (steam) fire and bilge pump, is supplied with one bilge injection, and has valves or cocks to all openings in her bottom.

The builders of the hull and machinery are Harlan, Hollingsworth & Co., of Wilmington, Del. She is owned by Mr. George R. H. Leffie.

THE STEAMER "PENGUIN."

This steamer was built by the Commercial Steamboat Company; and has but recently taken her place on the route between New York city and Providence, R. I. We annex full particulars of hull, together with minute details of her machinery:—Length on deck, from fore-part of stem to after-part of stern-post, above the spar deck, 165 feet; breadth of beam (molded), at midship section above the main wales, 30 feet 8 inches; depth of hold, 10 feet; depth of hold to spar deck, 17 feet 6 inches; draft of water at load line, 12 feet; draft of water below pressure and revolutions, 11 feet 9 inches; length of engine space, 10 feet 8 inches; tunnage, 460. Her frame is made of white oak, chestnut and hacmetac; it is molded 14 by 9 inches, and 11 inches, and 26 inches apart at centers; depth of her keel, 14 inches.

The *Penguin* is fitted with a vibrating lever (Ericsson) engine; diameter of cylinders (two) 48 inches; length of stroke of piston, 2 feet 6 inches; diameter of propeller 11 feet 6 inches; pitch of same, 20 feet; length of blades, 4 feet 6 inches; number of blades, 4.

She has one return tubular boiler, the length of which is 20 feet; breadth of same, 14 feet 3 inches; hight (exclusive of steam-chests) 13 feet 6 inches; and beneath this there are three furnaces—breadth 4 feet each; length of fire-bars 7 feet 6 inches. There are 93 tubes, the internal diameter of which is $3\frac{1}{2}$ inches; length of same, 15 feet; and they possess a heating surface of 2000 square feet; diameter of chimney, 4 feet 4 inches; hight 20 feet 3 inches; the load on safety valve, in pounds, per square inch, is 30; maximum revolutions per minute, at above pressure, 70. The area of immersed section (at load draft of 12 feet) is 323 square feet; the cross floors are molded at throats 14 inches, and sided 9 to 12 inches.

This vessel contains three masts, and is bark-rigged. Her boiler is located on deck; she does not use blowers. She is fitted with one extra size independent (steam) fire and bilge pump, has bilge injections, and valves or cocks to all openings in her bottom.

The builder of the hull is C. H. Mallory, of Mystic, Conn.; the builder of the machinery is C. H. Delamater, of this city.

THE UNITED STATES STEAM SLOOP "NARRAGANSETT."

As much has been written relative to the disparagement of this new vessel, and as our naval authorities have dispatched her to a southern navy-yard, preparatory to making extensive alterations and modifications in her machinery, we regard it as essentially necessary that our readers should possess a correct knowledge of her dimensions, with particulars of her engines and boilers; the details will be found annexed:—Length on deck, from knighthead to taffrail, 208 feet 3 inches; length at the deep load-water line, 186 feet 6 inches; length for tunnage, 188 feet 6 inches; breadth of beam (molded) at midship section, extreme, 31 feet 6 inches; depth of hold, 14 feet 2 inches; depth of hold to lower side of berth-deck beams, 5 feet 11 inches; draft of water at deep load line, 10 feet 3 inches; tunnage (carpenter's measurement), 930.

The *Narragansett* is fitted with two horizontal back-action engines; diameter of cylinder, 48 inches; length of stroke of piston, 2 feet 5 inches; diameter of propeller shaft, $9\frac{3}{4}$ inches; diameter of crank shaft, in journals, $10\frac{3}{4}$ inches; maximum pressure of steam (in pounds) per square inch, 20; maximum revolutions per minute, at above pressure, 80; weight of engines 80 tuns (179,200 lbs.); the length of same, fore-and-aft of ship, is 13 feet 9 inches; breadth, athwart of ship, 15 feet 5 inches; they are supplied with an adjustable slide cut-off; diameter of screw, 9 feet 6 inches; length, $37\frac{3}{4}$ inches; pitch of same, 18 feet 2 inches; number of blades, 2.

She has two of D. B. Martin's vertical tubular boilers, the length of which are each 10 feet 2 inches; breadth, 18 feet 6 inches; hight of same (exclusive of steam drum), 10 feet 7 inches; hight (inclusive), 11 feet 6 inches; and beneath them there are 11 furnaces—breadth, 36 inches; length of grate bars, 6 feet. There are 3,190 brass tubes, the external diameter of which is 2 inches; extreme length of same, 32 inches; extent of grate surface, 200 square feet, and they possess a heating surface of 5,945.7 square feet; diameter of small pipe, 6 feet; hight of same, above grates, 50 feet; length of engine and boiler space, 49 feet 3 inches; length of

shaft, above base line, 5 feet 4 inches. The area of immersed section (at load draft of 10 feet), is 253 square feet; displacement of water at load draft, 1,043.06 tuns; capacity of bunkers for coal, 194 tuns; description of coal used, anthracite; her draft is a screw fan.

This vessel contains two air pumps—one of salt water and the other of fresh; diameter of salt water pump, 18½ inches; diameter of fresh water pump, 13¾ inches. She is fitted with Pirsson's condenser, which contains 3,705 tubes; outside diameter of same, ⅝ of an inch; inside diameter, ½ inch; length, 4 feet 10 inches over all; and the tube sheets are ¾ of an inch in thickness. In addition to these, she has independent (steam) fire and bilge pumps of extra size, bilge injections, valves or cocks to all openings in her bottom, and all other necessary fixtures to make her a staunch and sea-worthy steamer. She is supplied with three masts, and is bark-rigged.

The hull was built by the United States government at the Charleston navy-yard; the builders of the engines and boilers are the Boston Locomotive Works.

BOWER'S ELEVATOR.

The elevator here illustrated is represented as raising water, though it may be used for other substances, equally well. The bucket, H, Figs. 1 and 3 is attached to the lower end of a series of lazy-tongs, G, the upper end of the series being connected with the inner arms of the levers, F. From the outer arms of these levers the ropes, D D, pass over the guide pulleys, E E, and are attached to the peripheries of the large wheels, C C, which are secured to the shaft, B. From this arrangement it will be seen that when a rocking motion is given to the shaft, B, by means of the handle, H, the bucket, H, receives a much greater motion either upward or downward vertically. To facilitate the filling and emptying of the bucket, the puppet valve, *d*, Fig. 3, is constructed in its bottom, and the sliding drawer, J, is arranged in the curb. When the bucket has been raised, the sliding drawer is pushed under it and the bucket allowed to descend into the drawer, when the projecting end of the valve rod pushes the valve upward, and allows the water to flow into the bottom of the drawer or spout, and out into any vessel placed properly to receive it.

Fig. 1

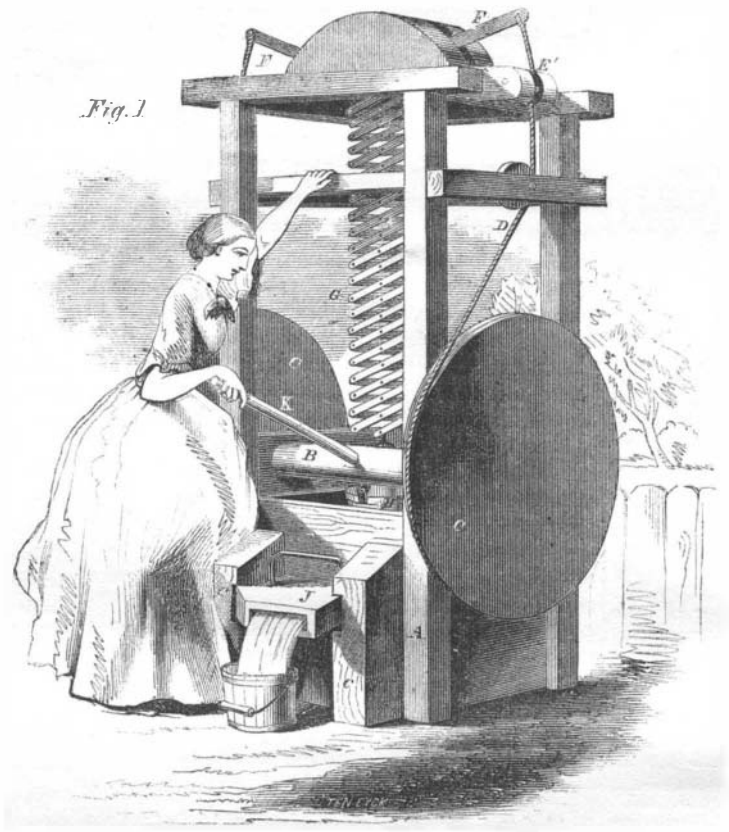


Fig. 2

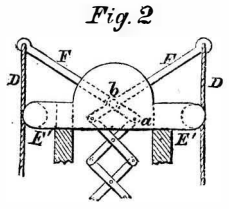
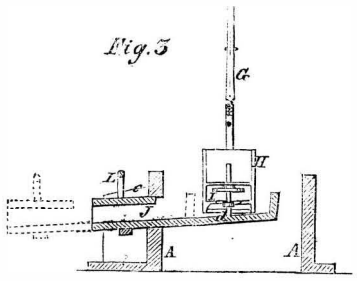


Fig. 3



BOWER'S IMPROVED ELEVATOR.

The patent for this invention was obtained, through the Scientific American Patent Agency, Aug. 2, 1859, and persons desiring further information in relation to it will please address the inventor, Abraham Bower, at Pekin, Ill.

RAILROAD COLLISIONS—AN ENGINEER'S DEFENSE.

The coroner's jury at Greenbush, N. Y., having censured H. B. C. Miliken, the engineer of the defective locomotive attached to the train that was run into on the Hudson River Railroad (as noticed by us on pages 80 and 89), he has come out in a written defence of himself. The censure was to the effect that he did not comply with the rules of the company, which require that when a train stops, it shall be where there is a clear view of it both ways. He says it was impossible for him to do so; the steam pipe of his engine gave way when he was approaching the curve; and he was driven from his post by steam and gas, so that it was impossible for him to do his duty. We admit the force of this defence; but there is one point which has not yet been cleared up, and which has never been touched upon in the decision of the jury or in the evidence adduced, and yet it is the most important one of all, namely, why was a defective locomotive employed in running that express train? This was the primary cause of the accident. Some person should be accountable for endeavoring to run the train with an engine which had to be stopped several times for repairs, and then broke down in such a dangerous position. Is the Hudson River Railroad so miserably managed that there is not a spare locomotive on it, between Albany and New York, to take the place of a broken-down one? The public wants satisfactory answers to these questions.

BOILER INCRUSTATIONS—EXPERIMENTS TO REMOVE THEM.

We have received a letter from Mr. C. C. Halladay, of Utica, Ill., likewise a specimen of incrustation (which is more than half an inch in thickness) that was removed by the sole agency of slippery elm placed in his steam boiler. He says:—"I always put in sufficient of the elm wood to color the water in the boiler, and I renew it as often as it is found necessary to keep it in that condition. If the elm is used in sufficient quantities, it will convert the scale into a thick black mud, which is easily blown off. I always put in the elm blocks as large as I can get them. I have secured a saving of at least 25 per cent in fuel since I commenced using slippery elm in my boilers."

Another communication has been received from J. W. H., of Newark, Ohio, whose previous letter we published on page 55 of the present volume. He gives us some of his experience in regard to the use of different substances in his boiler, and says:—"Molasses was the first thing which I tried to remove the scale from my boiler, but it did not effect the object. I then tried molasses to see if it would prevent the *formation* of scale, and for this purpose it was equally ineffectual as in removing it, while it tended to produce foam. Next I used hemlock bark, and its results were similar; tried it three different times. This experience I related to a friend of mine, who advised me to try chestnut-bark, and in accordance with his suggestion, I put an armfull of it into the boiler, which is 36 feet long, and 3 feet 4 inches in diameter. After running it for a week, the water was blown off, and another armfull of this bark put in, and the boiler run again for two weeks longer, then blown off and run out. The man-hole plate was then removed, and upon entering the boiler the incrustation was found to be 1⅛ of an inch thick; so the barks had no effect whatever, either in removing or preventing the formation of scale in any boiler. This is a plain statement of my experiments with molasses and astringent barks to prevent and remove incrustations. I have found the *pick* to be the only effectual friend for removing scale, and I have given my experience for the benefit of others who may place too much reliance in molasses and other substances. It would no doubt be best to prevent the formation of scale altogether; you recommend the use of pure water—so do I; but how shall we get it when it is not to be had? The water which we have here may be filtered for any length of time, and yet it will form incrustations when used in boilers. That which we use is first run from the creek into a low reservoir, and from thence it is pumped into a second reservoir or tank 180 feet high, from which it is fed to the boiler situated 75 feet below. This I consider pretty good filtering; the tank holds 6,000 gallons. I am now trying potatoes in the boiler to see what effect they will have."

We understand that Newark, in Ohio, is situated on the magnesian limestone formation; and cold filtration will not remove the lime held in solution by the water in that region. The method of filtration which we recommended on page 55 of the present volume, embraces the use of the exhaust steam to precipitate the lime on the water before it is fed to the boiler. Several of our correspondents who have tried oak and hemlock blocks with success, in preventing incrustations, have informed us that "the remedy is worse than the disease." They complain that the gallic acid in these astringent substances, when set free in the boilers, attacks the metal, and soon eats it through at the rivets and joints. If this is so, then, of course it forms a most serious objection to the use of those substances. We do not think that slippery elm will be found so injurious as oak, chestnut or hemlock; but it is only by continued experiments that this can be fully determined.

IRON-MASTERS' CONVENTION.—A large convention of iron-masters, capitalists and others recently met in Portsmouth, Ohio, and nearly every furnace and iron interest in Kentucky and Ohio were represented. After organization, a statement was made of the iron interests of the two States, from which it appears that the average produce of pig-iron from 62 furnaces is 155,000 tuns per annum; value of cold and hot-blast metal, $4,650,000; population supported by furnaces, 31,000; hands employed, 6,200, &c. The committee to whom the matter was entrusted reported a memorial to Congress, in which they represent the iron manufacture in such a depressed condition as to render the capital invested scarcely remunerative, and that relief can only be afforded by a specific duty on the import of foreign iron. A series of resolutions were passed, alleging, among other things, that it is the duty of Congress to afford such protection as will infuse new life and energy into the iron trade of the country.

TENUITY OF SILK.—One hundred yards of the raw silk of the silk-worm does not weigh a grain; and it has to be doubled and twisted many times to form a fine thread for domestic use. Still finer are the fragile threads of the spider, which, proceeding from 4,000 holes in the little animal, are all twined together to form one slight gossamer line.