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Contents:

WANT OF AMERICAN OCEAN STEAMSHIPS.

Several years since (May 16, 1857, page 285 Vol. XII, SCIENTIFIC AMERICAN, old series,) we directed the attention of our shipowners and capitalists to the great increase of European steamers in the Atlantic trade, and we urged upon them the policy and necessity of engaging in the construction of screw propellers. We said "the longer they delay the weaker and less able will they become in the struggle, while their rivals will be growing stronger and stronger." Since that period we have on several occasions recurred to the subject, and have advocated the construction of iron screw propellers in preference to wooden vessels. On page 305 Vol. I (current series) we said: "We have lost, and are still losing, our ocean carrying-trade, principally from a class of steamers, the efficiency of which our people do not yet appreciate; we mean iron screw propellers." At that period we had three lines of American steamers engaged in the Atlantic trade, now we have not one. It is indeed true that our steamships which had been engaged in this commerce, are now employed by Government in necessary and important services, but it is none the less a subject of regret that the American ocean carrying-trade has been almost destroyed for want of fast steamers; for if we had a sufficient number of these they would bid defiance to the *Alabama* and all its congeners, and would have maintained our ocean trade in its integrity. The Boston merchants have been somewhat aroused to a sense of the importance of this question, and a company has been incorporated with legislative authority to raise a capital of two millions of dollars to establish steam navigation between Boston and Liverpool. A meeting was lately held for the purpose of devising measures to establish the line at once, and it was stated that the present means of communication between that port and Europe were totally inadequate to the wealth and importance of the city, as her imports reached her by other ports, and exports which could be shipped from Boston sought other channels. We believe that a line of steamships running between Boston and Liverpool could be sustained under good management. To this end a first-rate class of vessels must first be provided, and these must be afterward conducted with economy and ability.

As we anticipated ten years ago, screw steamers are fast driving sailing vessels from the ocean trade. In 1852, the tunnage of foreign-going steamers entered inward at Liverpool was 188, 715 tuns; in 1862, it was 595,339; in 1863 it has increased to 756,420 tuns. In about ten years the foreign steam trade of Liverpool has more than quadrupled. At present there are eight different lines of Atlantic steamships —all European—besides a considerable number of transient steamers. Six of these lines have contracts for carrying the mails, and in the aggregate they embrace fifty-five vessels; the Canada Company have lately made contracts with Clyde engineers to build three more new first-class iron screw propellers. Other companies have also entered into contracts for building several new steamers, as those which they now possess are inadequate to meet the demands made upon them. An important fact in connection with the success of these European steamers is, that with very few exceptions they are Clyde-built vessels. Even all the German steamers which trade between Europe and New York have been built on the river Clyde in Scotland, and several new vessels for these continental lines are now being constructed in the same quarter. Formerly all the Cunard steamers were wooden paddle-wheel vessels, but all those built for five or six years past are of iron, mostly screw propellers; and hereafter this class, we understand, will be preferred on account of their economy in fuel. These are important facts, worthy of the profound attention of our capitalists and shipowners, as several new lines of steamers are projected in England; and if these should succeed in engrossing more of our carrying-trade, it will be difficult, if not impossible, hereafter, to restore this branch of our commerce.

PHOTOGRAPHY AND PRINTING.

On several occasions recently, we have referred to the efforts which have been made in Europe to apply photography to the art of printing. A late number of the *Popular Science Review* affords abundant evidence of the satisfactory progress made in this art, as its frontispiece is embellished with a printed copy of a full page of the London *Times*, taken by the photographic process, and reduced to a space of four by five and a half inches. It is like a miracle of art to see six columns of that large newspaper copied by the power of sunlight and printed in such a manner, with every letter as distinct as if it had been traced with the point of a diamond. The advantages of an art by which copies of objects can be taken direct upon a lithographic stone or metal plate and employed for printing, are self-apparent; as, from one original, thousands of copies may be taken with the aid of a printing press. Fox Talbot, the inventor of photography, seems to have first published in 1853, a description of a process of photographic printing. A solution of gelatine, containing a little bichromate of potash, is poured upon a steel plate and allowed to dry. The object to be copied is interposed between the metal plate and sunlight, being laid upon a plate of glass that is pressed upon the metal plate. That portion of the gelatine which is exposed to the light on the plate becomes brown in color and insoluble, while those parts shaded from the light remain unchanged. When the metal plate is afterward placed in water, those portions of the gelatine not acted upon, are dissolved, while those which have been exposed to the light remain. By pouring nitric acid upon the plate, those parts from which the gelatine has been dissolved are etched, leaving the protected parts untouched. From such a plate copies may be taken in the common press employed for copper-plate printing. This process is imperfect, because it will not give the half-tints of pictures, although it will produce good copies of leaves and objects which have well-defined prominent lines. Mr. Talbot has made an improvement for producing the half-tints, but it is very difficult to manage. Another process has been brought forward by M. Pretsch. A metal plate, or one of glass is treated with gelatine and the bichromate of potash, in the same manner as has been described; this is exposed to light under a photograph or an engraving, and is afterward moistened with water but not washed, as in the Talbot method. The moisture causes the parts of the gelatine not acted upon by light to swell up above the other parts of the surface, and a mold in wax is then taken from the plate from which an electrotype in copper is taken for printing. This process is very effective for large prints, but is not suitable for producing fine delicate work. Another process is employed for producing copies of maps at the Ordnance Office, Southampton, England. The metal plate is prepared with gelatine and the bichromate of potash, in the same manner as described; a photograph of the map is then taken on glass, and pressed against the prepared plate, which is then exposed to the light. A roller charged with lithographic ink is passed over the face of the plate and its whole surface is blackened. After this the plate is soaked in warm water, when the soluble portions of the gelatinized surface are dissolved out, leaving behind the picture or copy in ink. This is now placed in contact with a smooth plate of zinc and submitted to heavy pressure, when the ink is transferred from the copy to the zinc plate, and from this with suitable preparation, copies may be printed in a lithographic press. This process has been very successfully applied to the copying of manuscripts and prints.

This art is still in its infancy, but we think it is ultimately destined to achieve great results. The prominent advantage of photography consists in its quick production of fac-similes, and this art combined with engraving and printing, by making the same chemical agencies which produce the picture prepare the plate for printing, possesses incalculable advantages. Copies of objects of natural history, rare engravings and manuscripts, are now taken by photography and printed; but the art is capable of still further improvement and a more extended application.

"BOSSES" AND WORKMEN.

As a theme for an essay, the relation of Labor to Capital, or the reverse, affords an opportunity for many finely-drawn theories concerning the duty of each. The real nature of the relations which should exist between labor and capital appear to us to consist in combining, as far as possible, the two interests, and making both work together for mutual advantage. Both are formidable, and exert an immense influence for good or evil. The injurious effect which capital can produce on the welfare of the community is well shown by the combinations which from time to time take place in certain branches of trade; where by the accumulation of large sums for specific purposes, speculators are enabled to force the market prices of articles far beyond their actual value. So also when capitalists coalesce for the purpose of cheating the laborer of his hire, by depressing wages below the standards of value, or so that the necessaries of life cannot be procured, another example is furnished of the unjust and general baneful effect which capital may produce on the people.

Labor is also exacting in its demands, at times, and when it fancies it has the sweep of the market, so to speak, takes advantage of the circumstance like other speculators, and in some instances is enabled to carry out its objects, in others not; depending principally upon the ability of Capital to withstand the demand made.

Now when we have two great forces given, the problem is—how to employ them to the best advantage. If a man builds double-cylinder engines he does not set them so that the power of one shall act against the other, but he connects both to the same shaft with the crank at right-angles, opens the throttle and away they go. Thus it should be with "bosses" and workmen; let each pull on the same shaft; each is a mighty force singly, but when their conjoint relations are deranged they shake the whole world. An earthquake does not exhibit more disastrous physical effects than do strikes or monopolies upon the social systems of civilized nations. Trades whose interests conflict with those of capitalists, or are made so to do by the perversity or shortsightedness of the members composing them, find that in the course of time their wages decrease instead of increase, and that their social standing is diminished. Some trades are afflicted with chronic strike, and appear to be at continual variance with their employers.

It may be in such cases that the wages are too small to live upon, or the want of harmony may proceed from other causes too complicated to be discussed at present; whatever the reason, it is certain that trades continually on the strike cannot get on, because the attention of the members composing them is turned from the trade to other subjects. Our sympathies are with the working classes, male and female, because capitalists are quite able to take care of themselves, and even if their business is destroyed can fall back upon other resources. But with the laborer no such course is possible; his capital is his hands and skill, and it is for this reason that we deplore strikes and the results which spring from them. These results are briefly—destitution of the strikers, bad feeling engendered between the bosses and men, and disorganization and derangement generally antagonistic to the best interests of the men themselves. There are doubtless times when trades are justified and compelled in self-defence to rebel against the terms offered by employers; but as a general rule labor is better

paid in this country than anywhere else on the globe, and a skilled workman can always command a handsome remuneration for his services. The relations of labor and capital are bound up in three words—they are identical—and they should work together for mutual advantage.

A TOUR AMONG THE IRON-CLADS.

A recent tour of inspection made in one or two of the largest ship-yards, where iron-clads are now being built for Government, reveals the fact that they are in a forward stage of progress, and likely to be entirely completed at no very distant day.

THE "DUNDERBERG."

So much has been said about this vessel, that it seems almost supererogatory to add anything more; nevertheless it may be interesting to know that the work of plating is going forward with dispatch, and that, from present appearances, the ship will be ready long before her engines. The carpenters' work, inside and out, is finished—that is, comparatively little remains to be done; odd jobs here and there not being taken into account. The engine kelsons are all laid, and massive ones they are, too; the coal-bunker and bulk-head surrounding the boiler compartment are also in place; and so far as the carpenters are concerned we presume the vessel might be launched in a week. The below-water-mark plates are being fixed on the side, a layer of sheathing paper being placed between the plates and timber. The plates themselves are being laid vertically, not horizontally as usual, and are 4½ inches thick in the middle, tapering to 3 and 3½ inches at the extreme ends.

The casemated fortress on deck is also completed, so far as the main structure is concerned. The plating is not applied, and only the massive timbers, which constitute the casemate proper, are erected on deck. The port-holes for the guns are about the size of an ordinary window-sash—say three feet square, a few inches more or less; they are ten in number: three on each side, two forward and two aft. In one of them a rough template of what we took to be a 9-inch gun was placed on a temporary carriage, for the purpose of seeing what depression could be given to the weapon.

The *Dunderberg's* stern aft projects monitor-fashion about 25 feet, we should say at hazard; not having measured it we cannot speak by the rule. To protect this from the force of the sea, the under side of the tail is laid with narrow joists some three inches apart. Seas on striking these joists will be broken into spray, and the shock of impact much weakened; the main timbers of the tail are above these slats, and exert their full strength in supporting the structure. The engines of the *Dunderberg* are building at the Etna Iron Works. They are to be horizontal cylinders, 100 inches in diameter by four feet stroke of piston, having slide valves; from appearances it will be a long time before they are finished. No day is fixed for the launch of the ship.

Mr. Webb is also building two other magnificent steamers for the Pacific Mail Steamship Company; one of them is 340 feet long, 44 feet beam, and 31 feet deep; and is to have a beam engine of 105 inches cylinder by 12 feet stroke. The vessel will be, in all respects, similar to the *Constitution*. The other ship is to be 300 feet long, 43 feet beam and 27 feet deep, intended to run on this side of the Isthmus. When these ships are finished, the Company will possess a fleet which, for speed and comfort, cannot be surpassed in the world.

At Greenpoint, we found

THE "PURITAN" AND "ONONDAGA."

The first is the consort of the *Dictator*, and the latter a monitor battery of two turrets, contracted for by Mr. George Quintard. The outlines of the *Puritan* are still covered by the scaffolding upon her sides; the armor on the hips or shelves is not yet in place, although the carpenters are busily engaged in preparing the way for it. The deck is not completely laid, although in a forward stage of progress. The lower parts of the ship are still in an unfinished condition; the engine room is in a state of chaos, and only the cylinder bolts, pillow blocks and some other parts, are in place. This part of the ship has been much delayed by the strike of the machinists, and also an accident which happened to a cylinder of the *Dictator*; one of these being smashed last winter, necessitated the substitution of one intended for the *Puritan*. Mr. Rowland informed us that, so far as he was concerned, the ship might be launched in forty days.

The *Onondaga* has a large force of mechanics employed on her, and will soon be ready for sea. The turret bolts do not go clear through, but a jacket two inches thick is slipped over the main part of the turret; between the jacket and the turret a rust joint is driven—that is, cast-iron borings mixed with sal-ammoniac and borax, or urine—this is driven in tightly between the jacket and turret. The whole structure is of the same thickness as the ordinary turrets. No shot can drive bolts into the turret with this arrangement, as they do not go through the outer jacket. The *Onondaga* has two 15-inch guns and two 200-pounder Parrotts. One of the 15-inch guns is turned off at the muzzle, and the port is enlarged two inches; by this means the piece can be run out of the port, as is ordinarily done. In a short time it is hoped that the vessel will be able to take her place in the fleet.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list:—

Gun Chassis.—This invention relates to chassis working on center pintles and to the application to the traverse wheels of such chassis of a system of toothed gearing operated by a hand crank or its equivalent, for the purpose of producing the traverse movement. In all previous applications of gearing in connection with the traverse wheels, the gearing has been applied only in connection with the wheels in the rear or with those in front of the chassis, generally with the former, and in case of the setting of the platform, and from other causes, the wheels to which the gearing has been applied have been liable to a failure to bear upon the traverse circles or segment rails, *in* which case the gearing would be useless, and the use of handspikes would have to be resorted to to produce the traverse movement. This invention consists in applying a system of gearing to both the front and rear sets of traverse wheels, in such a manner that both sets are caused always to operate together so that whether both sets or only one set has a bearing on the traverse circles or segment rails, the gearing will not fail to produce the traverse movement. S. J. Ashley, of San Francisco, Cal., is the inventor of this improvement.

Working Gun Carriages.—The object of this invention is to enable heavy guns, placed in turrets or otherwise, to be worked with the least possible number of hands and to reduce the recoil in the greatest possible degree. The invention consists, first, in the employment for controlling and checking the recoil of a gun carriage and for holding the same stationary while loading and at other times, of a self-acting friction brake or clutch detached from the carriage but geared therewith by a suitable system of toothed gearing. It consists, secondly, in the employment of the same system of gearing by which the gun carriage is geared with the aforesaid friction brake or clutch, for the purpose of running the carriage out for firing or of moving the carriage in or out for any other purpose. It consists, thirdly, in so constructing and combining the parts of the aforesaid friction brake or clutch, and so applying a movable stop in combination with them, that by the mere shifting of the stop, the brake or clutch is brought either to a condition to check the recoil or secure the carriage, or to a condition to permit the carriage to be run out or in freely. Capt. John Ericsson, of New York city, is the inventor this improvement.

Fan Blower.—The principal object of this invention is to make a fan blower which will produce the same effect when worked in either direction in contradistinction to ordinary fan blowers, which work in scroll-shaped cases, and consequently act in a different manner when turned in one than when turned in the opposite direction. The invention consists in an annular air chamber surrounding a conical cavity, and communicating with the same at its apex in combination with triangular wings working in said double conical cavity in such a manner that, on imparting to the wings a rapid rotary motion, the air passing through the central openings into the double conical cavity, is forced in the annular air chamber, whence it is conducted by a suitable tube or tubes to the place or places where the blast is to take effect. William Winter, of Plainfield, N. J., is the inventor of this improvement.

Saccharine Liquid Evaporator.—This invention consists in the employment of two or more pans placed one above the other in combination with two or more furnaces, suitable flues and dampers, in such a manner that the heat from the first or lowest fire can be made to strike the first pan, or turned off from that pan and made to strike the second pan or any other pan above the first, and the heat from the second fire can be made to strike the second or any other pan above, and so on, and consequently the second pan can be exposed to the combined heat of the first and second fires, the third pan to the combined heat of the first, second and third, or of the second and third fires, and so on, and thereby the heat of each pan can be graduated to any desired extent, and the evaporation of the juice effected in a short time, with comparatively little fuel and labor and in the best possible manner. J. C. Chesney, of Abingdon, Ill., is the inventor of this improvement.

Burglar-proof Safe.—This invention consists in interposing between the walls of a safe a series of balls of cast-iron or other hard metal or material, arranged in such a manner as to be enabled to work, play, or turn freely between the walls and present a perfect barrier to a drill, router, or other burglar tool; the balls, in consequence of being allowed to turn freely, preventing a drill or router from acting upon them, and being of different diameters so as to effectually preclude a drill or router being used without coming in contact with a ball. The invention also consists in the employment of a flange or plate applied to the safe and in connection with the outer plates of the same, in such a manner as to prevent the outer plates from being wrenched or torn off from the same. The invention further consists in the application of a steel plate to one of the inner walls of the sides of the safe, for the purpose of protecting the inner plates or prevent them being broken and dislodged should the outer plates be wrenched off from the safe. Isaiah Rogers, of Washington, D. C., is the inventor of this safe.

Weighing Scales.—The object of this invention is to obtain a scale for weighing without the use of detachable weights, and one which will admit of being readily counterpoised or balanced at any time, when not properly in a balanced state, so as to insure perfect accuracy. To this end the invention consists in attaching, by means of a rod, a plunger to one end of the scale beam, said plunger being immersed in quicksilver or other fluid or semi-fluid contained within a suitable vessel, said fluid or semi-fluid serving to buoy up the plunger and causing the latter to serve as a counterpoise of varying capacity according to the size of the articles to be weighed. H. W. Catlin, of Burlington, Vt., is the inventor of this improvement.

Rice-polishing Device.—This invention relates to a new and improved machine for polishing rice after the same has been divested of its hulls. The object is to obtain a machine of the class specified which will be more efficient in its operation than those previously devised, by admitting of the free discharge of the dust or flour from the screen, so as to prevent the choking or clogging of the same; also by preventing the wire-cloth of the screen from being bent or getting out of proper shape or form; and further, by having the polisher arranged so as to be capable of being adjusted, and giving the screen a rotary movement as well as the polisher. Silas Dodson, of Bloomsburg, Pa., is the inventor of this improvement.

Port Closers for Forts and War Vessels.—This invention consists in the employment, for the purpose of closing the ports of vessels-of-war or the embrasures of forts, of two rollers, each being made to rotate independently of the other and provided with a cavity in one side, so that by turning the rollers in such a position that the cavities face each other an opening is obtained which is not wider than the muzzle of the gun and allows of giving to the gun any desired elevation or depression, and at the same time said rollers allow of training the gun to an angle of 45 deg. or more with the beam, and if the rollers are both turned in such a position that the cavities face the interior of the vessel or fort, the port or embrasure is firmly closed. The invention consists also in the application of semi-circular flanges embracing